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GLASGOW: 87, UNION STREET
Telephone: Central 4646
NEWCASTLE-ON-TYNE: 4, ROYAL ARCADE, PILGRIM STREET
Telephone: Newcastle-on-Tyne 22239
MANCHESTER: CENTURY HOUSE, ST. PETER'S SQUARE
Telephone: Central 3101
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An index to the eighty-ninth volume of THE RAILWAY GAZETTE *covering the issues from July 2 to December 31, 1948, has been prepared, and is now available free of charge on application to the publisher.*

THE PROBLEM OF
RAILWAY PASSENGER FARES
AND TRAIN SERVICES

A suggested plan for equalising passenger travel over both rail and road services

BY J. H. LAUNDY

Formerly Audit Accountant, Southern Railway

PRICE ONE SHILLING

THE RAILWAY GAZETTE
33, TOTHILL STREET, WESTMINSTER, S.W.1

Another Steel Production Record

DESPITE the shadow of impending nationalisation which is overhanging the industry, steel production in February was at the annual rate of 16,176,000 tons, easily the highest ever reached. The best previous month was November, 1948, when the annual rate was 15,760,000 tons. In February last year the rate of output was 15,049,000 tons. February is not a holiday month, but output is often affected by bad weather. This year, however, weather conditions have been particularly favourable. The campaign to secure maximum supplies of home scrap is going well, and scrap supplies are being maintained well above normal expectations. The flow of imported scrap also has improved considerably. The British Iron & Steel Federation, in announcing the February record, adds that pig-iron output was at the rate of 9,422,000 tons a year, compared with 9,169,000 tons in February, 1948. For the whole of last year, steel production was 14,877,000 tons, compared with 12,724,000 tons for 1947. Only in the third quarter of last year was the quarterly production at a lower annual rate than the total for the year, and for each of the two months of this year it has been very considerably in excess of it.

* * * *

The Ulster Transport Authority

In our August 13, 1948, issue we dealt at some length with the Transport Act, Northern Ireland, which had just received the Royal Assent. This measure brought into being the Ulster Transport Authority under the Chairmanship of Major F. A. Pope. We compared the likenesses and differences of the Northern Ireland Act and the British Transport Act, 1947, which established the British Transport Commission. In a recent issue of the *Leyland Journal* Major Pope gives an interesting account of the progress which is being made by the Ulster Transport Authority. He points out that on the rail side the Authority has acquired, so far, only 80 miles of track in County Down, with 30 locomotives, 200 passenger carriages, and 630 goods vehicles, with 38 stations, together with the well-known Slieve Donard Hotel in Newcastle and a number of refreshment rooms. The principal undertakings authorised under the Act to be acquired and not yet taken over are the Northern Counties Railway, with 245 miles of track in the Counties of Antrim and Londonderry, the Northern Ireland portion of the Great Northern Railway (Ireland), with 318 miles of track in the Counties of Antrim, Armagh, Tyrone, and Fermanagh, and the Belfast City passenger services owned by the Belfast Corporation.

* * * *

Negotiations with British Transport Commission

An advanced stage has been reached in negotiations with the British Transport Commission, which owns the Northern Counties Railway, and completion is expected shortly. Meantime, by agreement with the Commission, the undertaking is being managed and controlled by the Authority. The transfer of this undertaking to the Authority will bring its rail mileage up to 325, almost half the total track in Northern Ireland, and give it an additional 63 locomotives, 240 passenger carriages, 2,299 wagons, 53 railway stations, 9 refreshment rooms, and three additional hotels—the Northern Counties Hotel at Portrush, the Laharna Hotel at Larne, and the Midland Hotel in Belfast. The G.N.R. (I.) presents special difficulties as 225 miles of its track lies in Eire and it crosses the boundary at 14 points. Sir James Milne's report to the Government of Eire recommended the transfer of the Northern Ireland track to the Authority and the joint operation of rail services over it with the Eire Transport undertaking.

* * * *

Australian Commonwealth Railways

The system of the Commonwealth Railways includes four separate lines, the Trans-Australian Railway, from Port Pirie to Kalgoorlie; the Central Australia Railway, from Port Augusta to Alice Springs; the North Australia Railway, from Darwin to Birdum; and the Australian Capital Territory Railway, from Queenbeyan to Canberra. The total mileage is 2,201. For the year ended June 30, 1948, there was a loss of £201,973, compared with a loss of £124,779 for the previous year. The report for 1947-48, received from Mr. G. A.

Gahan, Commonwealth Railways Comissioner, shows that the increase in expenditure from £1,224,332 in 1947 to £1,439,017 was due largely to increased wages and overtime pay. Total earnings of £1,237,044 compare with £1,099,553 in 1947. An interesting feature is the continued increase in the number of through passengers carried on the Trans-Australian Railway, 43,538 against 26,627 in 1939. On the Central Australia Railway passenger traffic increases annually; the total carried in 1948 was 22,418, against 21,048 in 1947; the North Australia and the Australian Capital Territory Railways show a small decline. Earnings from goods and livestock traffic showed substantial increases, except on the North Australia Railway, where there was a decline.

* * * *

An Extension for the Bakerloo Line

Lord Latham, Chairman of the London Transport Executive, announced on March 4 that London Transport will soon be starting preliminary work on an extension of the Bakerloo Line from Elephant & Castle to Camberwell Green. It will run in twin tunnels, roughly following the line of Walworth Road and Camberwell Road to Camberwell Green, where there will be reversing sidings. The total length, including these sidings, will be about two miles. It will be entirely in tunnel, 40 to 80 ft. beneath the surface, and will take three to four years to build. The improved reversing facilities will make possible an improvement in the service on the whole Bakerloo Line by increasing the frequency of trains and the carrying capacity by roughly 25 per cent. The cost of the extension itself will be approximately £3,500,000; this, and the increased service planned, will call for 14 more complete trains, made up of 98 cars, which will cost over £1,000,000. To accommodate the new rolling stock a depot will be built at the other end of the line, at Stanmore. Lord Latham also gave, as a tentative date, the end of 1950 for the commencement of the first stage in the conversion of all London tram services to bus operation. The cost of conversion, involving the replacement of over 800 trams by some 1,100 buses, assuming prices remain at their present level, will be nearly £10,000,000.

* * * *

Demurrage on Railway Wagons

The annual report of the Liverpool Steam Ship Owners' Association refers to the settlement of a dispute which has continued since 1939 and which arose out of a statutory Order imposing liability for demurrage on railway wagons delayed longer than one day. This liability was imposed on the "trader" and the shipowners contended that they were not traders within the legal scope of the Order, and that in any event the "free time" allowed for handling wagons was unreasonably short. Though an agreed "list of circumstances" beyond their control was drawn up, shipowners were advised to repudiate all claims until final settlement, and when the shipping requisition period ended, the Minister of Transport ruled that all claims then outstanding should be treated as cancelled. In 1948, the General Council of British Shipping took the matter up with the Railway Executive, when a working party, with representatives of both sides, was formed to examine the position at the main ports. Settlement was reached in September, 1948, and the terms included final disposal on an agreed percentage basis of all claims outstanding from September, 1946, to January, 1949, and also an arrangement whereby shipowners would accept liability after a specified "free period" with the right to rely on the "list of circumstances" previously agreed. These arrangements will be reviewed at the end of six months.

* * * *

American Railway Abandonments

Although the tide of American railway abandonments slackened somewhat in 1948, it continued to flow at a substantial pace. With operation abandoned over a further 617 route-miles of line, the total U.S.A. mileage so abandoned in the 32 years from 1917 to 1948 has mounted to no less than 33,095 miles—an average of over 1,000 miles annually. In nine years, 80 smaller railways have shut down completely; during 1948 their numbers were increased by six, the longest of which was the Tonopah & Goldfield in Nevada, 97 miles in length; the remaining 26 miles of the Tonopah & Tidewater, in California, shared the same fate. Reasons for closure have varied; they have included unnecessary duplication of facilities, damage by floods on so extensive a scale that rehabilitation would have been an unwarranted expense, and loss of patronage by the public. As was remarked recently by Mr. Ralph Budd, President of the Chicago, Burlington & Quincy Railroad, in testifying before the Interstate Commerce Commission in connection with an application for abandonment: "We haven't abandoned people on branch lines until they have abandoned us." The Southern Railway, U.S.A., testified before the I.C.C., in applying to abandon a 50-mile branch, that it had been losing an average of $59,000 annually in giving service to an area of which the largest community had no more than 600 inhabitants. To balance abandonments, 250 miles of new line were opened in the U.S.A. during 1947 and 1948.

* * * *

Improvisation in Emergency Girder Renewals

Recently, it became necessary to replace four of the 214-ft. spans of the Damodar Bridge on the broad-gauge system of the Bengal Nagpur Railway, damaged by fire. The acute shortage of steel, however, precluded the construction of new spans, and the only comparatively large girders available in India were some held in reserve by the Railway Board against wartime emergency requirements. They were, in the ordinary way, suitable only for metre-gauge loadings, and were only 100 ft. in length. By constructing intermediate piers, the Damodar gaps were reduced to about 100 ft., eight in number, and by using three instead of the normal two girders per span, 24 of these metre-gauge girders were utilised to fabricate the eight broad-gauge spans required. The work was carried out in the engineering shops of the B.N.R., but it was necessary to construct a special gantry to handle these 30-ton girders; they are 9 ft. deep, and a slice had also to be cut off the end of each to fit the gaps.

* * * *

Multiple Ballast Tamping Machine

The use of a ballast tamping machine on British Railways is a reminder that these machines are now so greatly in demand in America that even the Pullman-Standard Car Manufacturing Company has turned its attention to their production. This firm's standard machine, controlled by one man, has no fewer than 32 tamping bars working in unison under uniform pressure and at the same ballast depth. The average length of track packed by it in one hour is said to be from 450 to 500 ft. Other claims for it are a 50 per cent. reduction in cost of ordinary maintenance and that it saves its cost within a year. Track packed in this way has proved its superiority in stability and smooth riding over all others, after over a year under heavy traffic, during which practically no spotting has been necessary. This has been the experience gained on over 1,000 miles of high-speed main-line track on various American railways, we are informed. Such machines certainly appear to constitute an important factor in the solution of the ever-increasing permanent-way labour problem.

* * * *

Mechanised Equipment on American Railways

The extent to which mechanical equipment is used on American railways is shown in a review published in the January issue of *Railway Engineering & Maintenance*. Reports from 427 railways in Canada, the United States, and Mexico show that some 9,300 power machines and tools, costing approximately $18,700,000, were purchased during 1948. This equipment included over 2,000 rail cars, for the transport of men and materials, some 840 rail-laying machines, and nearly 800 ballasting and surfacing machines. Both the number of units purchased, and their value, show a slight decrease as compared with 1947, when it was estimated that these railways purchased 9,500 units of mechanical equipment at a cost of $19,100,000, but the figures for 1948 are only slightly below the peak reached three years earlier. A deciding factor in these purchases of mechanical plant is the unchecked rise in the cost of labour. It is realised that the time is at hand when the railways will be unable to increase rates to offset higher wages without losing a large amount of traffic to competitive forms of transport.

Steam Development on a United States Line

Partly due to the large bituminous coalfields through which it passes, the Chesapeake & Ohio Railway has played a notable part in the development of steam motive power in the United States, and the introduction, last year, of a steam turbine-electric locomotive for working high-speed traffic between Washington and Cincinnati, marked a new high level in C. & O. achievement. The C. & O.'s progressive policy of locomotive development over a period of 25 years, forms the subject of an illustrated article elsewhere in this issue, commencing with the year 1924, when the American Locomotive Company delivered 25 2-8-8-2 Mallets of exceptional power and size. As strict account had to be taken of clearance limitations in designing these powerful locomotives, it was not found possible to incorporate compound cylinders in them, and the use of simple-expansion cylinders in a Mallet locomotive, though not unique, was a noteworthy departure from usual practice. Subsequently, various 2-10-4 and 2-8-4 engines have been built for freight service, and in 1941 there appeared the first of 45 2-6-6-6 Mallets, which had a boiler with a combined heating surface of 10,426 sq. ft. and a grate area of 135·2 sq. ft.; the rated tractive force of 110,200 lb. compared with the 103,500 lb. of the 1924 Mallets.

* * * *

Irish Transport Company

THE report of the directors of Coras Iompair Eireann (Irish Transport Company) for the year 1948 is a much briefer document than usual and is restricted to a summary of the net revenue account, the revenue accounts of the various divisions of the undertaking, and the balance sheet. The directors' remarks are confined to a brief statement recalling that the Irish Government has announced its intention to submit proposals for the immediate nationalisation of public transport, that the directors will do everything in their power to protect the interests of the stockholders and that very full and strong representations to the Minister for Industry & Commerce regarding equitable compensation have been made. The report is signed by Mr. A. P. Reynolds, as Chairman, and Mr. H. S. Boardman, Secretary.

The outcome of the operations of the company was a loss of £1,424,328 compared with a loss of £912,353 in respect of 1947. The debit balance was raised to £2,236,229 from £811,901. The loss on railway operations was £1,275,455 (compared with £995,897 for the previous year), notwithstanding an increase in passenger traffic of £283,054 to £1,894,686, in goods traffic of £79,393 to £3,325,377, and in miscellaneous traffic of £7,993, to £28,962. Expenditure, before depreciation, was up by £583,998 to £5,962,480. Maintenance of rolling stock at £1,305,685, accounted for £332,972 of this increase.

The following table compares some of the principal results for the last three years:—

	1946	1947	1948
	£	£	£
Railway passenger traffic ...	1,689,473	1,611,632	1,894,686
Railway goods traffic ...	3,261,503	3,245,984	3,325,377
Miscellaneous	21,581	20,969	28,962
Bus services	2,528,852	2,321,295	2,932,064
Tramways	279,254	230,177	259,918
Road goods services ...	826,935	1,141,189	1,066,610
Hotels	240,757	254,277	324,684
Gross revenue	8,848,355	8,825,523	9,834,301
Expenditure	8,433,138	9,328,969	10,691,955
Net operating revenue ...	+415,217	−503,446	−857,654

The credit balances from the non-railway accounts were: buses £298,422 (against £443,911), tramways £11,216 (against £18,089), road freight £5,778 (against £16,280), hotels £23,385 (against £14,171). The total of these balances at £338,801 compared with £492,451 for 1947.

The balance sheet shows £3 million of 2½ per cent. debenture stock outstanding compared with £1,350,000 at the end of the previous year. Among current liabilities, which total £2,135,950 on this occasion against £1,668,627 at the end of 1947, are a banker's loan of £531,493 (£416,258), sundry creditors at £823,849 (against £744,587) and an advance under the Transport Act, 1944, of £175,416 which is a new item. Liability for taxation is put at £119,212 (against £59,265). Among the fixed assets railway rolling stock is entered at £2,564,171 compared with £2,683,336, but the bus fleet is now valued at £743,610 against £248,003 and lorries at £718,176 against £501,368.

Shorter Trains and More of Them—VII*

OUR six "Shorter Trains and More of Them" articles have brought much correspondence both published and not for publication. We have even been asked to "lay off" this subject as the work involved in a thorough-going timetable revision would be so immense. But we think it would be well worth while. The work of revision of freight and passenger working timetables must be faced if the nationalised railways are to give the public better services. We do not underestimate the work involved. But when once the job has been done the change-over from winter to summer service and *vice versa* will be far less difficult and costly than it is today.

Some of the criticisms sent us complain of the poor speed of the services suggested in our previous articles. But the proposed services could quite well be accelerated or (which we think would be more valuable) given more stops in their suggested timings. It will be noted that on the shorter "commercial" journeys (London—Bristol, London—Birmingham, etc.), where business men make the double trip in the day, we have suggested only very trifling increases in the schedules of 1939. On the longer journeys we have not suggested long non-stop runs or high-speed services because the former benefit the through passenger only, and the latter introduce a speed-variation which must affect the carrying capacity of the line. The basic idea of these articles is the provision of a frequent and comfortable service for the benefit of the country as a whole.

We have not specified exactly what we mean by "shorter" trains. To some extent their length must of course depend on their frequency—*i.e.*, how far our proposals are adopted. Generally we have envisaged a maximum of 10 vehicles—say 330 tons—but eight-vehicle sets should suffice in many cases.

Public Preference

We do not agree with the view that the present departure times of express services are necessarily those which the public prefers. The public in very many cases has never been offered any alternative. This applies particularly to earlier morning express departures and to early services from London to the provinces—always much worse than those from the provinces to London. It has been argued in correspondence that departures from London round about 10 o'clock are very popular and an 8 o'clock departure of a semi-fast breakfast-car train would be too early, but it would give travellers in a provincial town two or three hours away a service at 10 or 11 instead of no service till noon as is sometimes now the case. The old Midland's 8.25 semi-fast breakfast-car train to Manchester calling at Luton and six other stations, due Manchester Central at 12.55, was a popular train. After a "wash and brush up" in the station it returned to London at 1.50, as a luncheon and tea-car train, earning money for 10 hours.

One easily made criticism on our suggested outline of timetables revision put forward in previous articles is that insufficient margins have been allowed for freight train working. Such critics cannot have read the articles carefully. Another is that additional trains, though shorter, will require more coaches and the time is inopportune to embark on extensive alterations and additions having regard to the information available concerning arrears of track maintenance, the coaching stock position, and the shortage of engine power. But our articles never suggested that a timetable revision such as we envisage could be introduced next month or even next year. It could only be done after a full investigation.

Concerning freight train paths and high-speed trains the capacity of a line is governed by the length of the block sections and variation in train speeds. Will there not be far more vacuum braked freight trains in future? Can railways ever overcome the costly handicap of four transhipments as against the road vehicle's two? As the roads become more and more congested won't passengers, who load and unload themselves, predominate on the railway, given equality in fares as between road and rail?

A complete timetable revision adopting the principle of shorter trains and more of them and involving a more even flow of traffic should have many far reaching repercussions. It would obviate the necessity for enlargement of several ter-

* Previous editorial articles on this subject appeared in our issues of July 16, August 29, October 1, November 5, November 12, and December 3

minal stations at a cost of many millions. The lengthening of platforms at stations where long trains have to draw up twice would not be necessary. Would not shorter trains at moderate speeds effect economies in track maintenance? Two years ago the Swiss Federal Railways put on some very fast trains between Geneva and Zurich, but had to decrease their speed owing to the damage they were doing to the track.

Effect at Stations

Another repercussion brought about by shorter trains and more of them would be a reduction in station staff. What happens now at a terminus with a bunch of 16-coach trains departing round about 10 o'clock of a morning? There is congestion where the cabs and cars arrive; long queues in the booking office; and not enough porters to go round. Then the Captains and the Kings depart and the station goes quiescent for two hours or so. Stations *en route* are similarly affected by a long train. A correspondent writing in our January 7 issue instanced Leamington: "I have seen American visitors hauling their own baggage out of the guards' vans of trains from London and staggering with it to the bay where the Stratford train waits. This is no criticism of the Leamington station staff. We have an excellent stationmaster and a willing lot of foremen and porters, but they are numerically not strong enough to 'do everything' when the lengthy London trains come in."

A complete timetable revision would also cover branch-line services. It may be that a number would be closed; but not necessarily all. Almost without exception the principle governing branch-line services has been to provide a service to and from the end of the branch connecting with main-line trains at the junction station. Often these ran at very inconvenient times for local travel; so the buses with their cheaper fares and more convenient services have taken away much of the local railway traffic. The standing charges of a branch line or cross-country line are the same whether the service is six trains a day or three. As running costs per train mile have to bear their share of standing charges it necessarily follows that costs per train mile increase as train mileage decreases. An engine standing in steam at one end or other of a branch line is earning nothing. Whether adopted or not, a complete scheme of timetable revision or "rescheduling the schedule" as Cecil Paget termed it, would be of unquestionable value in budgeting the locomotives and rolling stock building programmes. To get all the possible economies out of a timetable revision it is essential that the new timings should be worked out in conjunction with the motive power officers.

Locomotive User

Colonel Rudgard, Chief Officer (Motive Power) Railway Executive, stressed this matter in his recent Presidential Address to the Institution of Locomotive Engineers. He said that with the running cost of a locomotive being so high as well as the initial cost of the machine itself, it definitely called for trains being put to locomotives and men as far as possible and not locomotives and men to trains. He therefore advocated the timetable revision in order that the intensive user of locomotives can be determined in the diagrams. He was prompted to this conclusion in a great measure by the present weekly cost of drivers, firemen, and cleaners, which is in the region of £830,000, which added to the cost of coal—£695,000—total £1,525,000 per week. He said: "When one discusses the re-scheduling of the schedule these days, one is so often met with the reply that the trains must be run for the convenience of the public. I say, given punctuality, civility and cleanliness, the public will travel in the trains as offered. If electrification takes place, trains are diagrammed in order to obtain the maximum availability so that the minimum number of power units are required, and this would be true of diesel-electric locomotives. Therefore, in any re-scheduling in order to get the maximum user of locomotives and thereby utilise the assets to the full, the trains must be put to the locomotives and the drivers and firemen."

We hope it will be decided to form a committee and staff from the operating, motive-power and commercial departments and the Road Executive to do nothing else but draw up a scheme for timetable revision. The Road Executive should certainly be called into a railway timetable revision so that bus services to adjacent towns and villages may connect with the trains at each railway station. Assuming that stations B, C, and D are closed on a main line between A and E, there would be a road service between A and E serving B, C, and D, and other places on the way. Obviously they would take one Region at a time. Which should be taken first we do not suggest. With its intensive electrified services there is less scope on the Southern Region than any of the others, so that could no doubt be left to the last. When the scheme for a Region was completed the accountants would come in. Their calculations would give the answers to a number of questions. Then the Executive and the Commission would decide whether the scheme was worth while trying out on one Region to start with.

Questions for Accountants

What are some of the questions the accountants' calculations would answer? Would saving in coal consumption by shorter trains be more than offset by increased mileage? What capital expenditure would be saved by more evenly spaced traffic avoiding the necessity of enlarging terminal and other stations? Would there be savings in track maintenance because of shorter and lighter trains? What would be the saving in station staffs because of more evenly spread train services? What would be the increase in earnings per locomotive by better user? Similarly, what would be the increased earnings per carriage? Would the revised timetable decrease the stock of locomotives and rolling stock previously required and, if so, what would be the capital and revenue expenditure thereby saved?

Apart from any losses or gains of territory which geographical rearrangement of the existing Regions may involve, the compilers of new timetables for the nationalised railways must get away from the ideas which governed the old services of Groups or of individual companies. There is no reason, for instance, why Midland-Scottish trains should not continue, north of Carlisle, over the old Caledonian, or expresses from Euston take the old G. & S.W. and North-British routes beyond the border. Similarly, Leicester, Nottingham, and Sheffield can be put on the route of an "East Coast" express by making Marylebone instead of Kings Cross, its starting point. We have mentioned a few such cases in our articles, but there are innumerable possibilities to be explored when new timetables are being framed, and, above all, the old idea of "frontier" stations, where train loads of passengers were (and still are) needlessly changed, must be forgotten.

Two points from continental timetables which might profitably be adopted by British Railways are: (1) Numbering of trains—odd numbers "down" and even numbers "up," with consecutive numbers for balancing services—and the trains to be referred to by these numbers in public announcements. (2) Uniform stops in each direction, by "balancing" pairs of trains. This would simplify marshalling and give the stations concerned an "even" service in both directions.

* * * *

Opposition to Bus Nationalisation

TWO factors seem to have reduced very considerably the organised opposition to bus nationalisation by means of Area Schemes, at any rate so far as concerns the operators affected by the proposed North-East Area Scheme. The municipalities continue to be doubtful about the matter, but their loyalties are divided by the allegiances of their Socialist majorities as between Party and local interests.

Durham County Council has decided to support the Area Scheme, but is insisting on representation on the Area Board. Northumberland County Council has reversed a recommendation of its Parliamentary Committee that nationalisation of passenger road transport would not benefit the travelling public. Sunderland Town Council has decided to participate in principle, and Tynemouth Corporation appears to be the only municipal authority which has announced its definite opposition to the scheme. The municipal operators nevertheless show a keen desire to preserve the greatest measure of local autonomy in the control of their transport.

Resistance of the independent operators appears to have crumbled, as the members of the Northern Road Transport Owners' Association, which has about 150 members and is said to represent 98 per cent. of the independent interests in

the area, has decided that the scheme is inevitable, and that, therefore, they would offer their undertakings voluntarily to the Road Transport Executive. Many of them felt that there was little difference, from the viewpoint of the independent, between a company monopoly (which had been the trend of recent years) and a State monopoly.

Nevertheless, this view is not held by the British Electric Traction Company, and a meeting of independent operators was organised on March 3, in Newcastle, under the Chairmanship of Major G. W. Hayter, General Manager of the Northern General Transport Co. Ltd., the local unit of the B.E.T. Group. There were represented at the meeting 32 proprietors, operating more than 1,200 buses, of which the principal were the Northern General and its subsidiaries, consisting of five companies with some 720 buses.

Major Hayter introduced to the meeting Mr. H. C. Drayton, Chairman of the British Electric Traction Co Ltd., who said he wanted to make quite clear the attitude of the B.E.T. Group to bus nationalisation. "Our position," he said, "is perfectly simple. We are not prepared to negotiate in any shape or form with the British Transport Commission for the voluntary sale of any of our undertakings." Mr. Drayton emphasised that this was the considered opinion and policy laid down by the whole of the B.E.T. board. Nevertheless, he was not there to tell other operators what they should do.

Giving the reasons for the policy, Mr. Drayton said, "We believe that it would be against the interests of the public whom we serve that passenger road transport should be nationalised, and we are convinced that it is impossible for their interests to be protected in an adequate manner by a highly centralised bureaucracy. Our buses in private hands have served the public without any material increases in fare tariffs for a generation, and if the experience of the nationalisation of coal, electricity, or railways is anything to go by, then the public will find that nationalisation of this industry would inevitably be followed by higher fares. In principle, we object to the whole policy of nationalisation. We fought in connection with our electricity interests and we are fighting it in the case of our road passenger interests."

The Omnibus Passengers' Protection Association also held a meeting in Newcastle, on the next evening (March 4), and passed a resolution opposing the acquisition by the British Transport Commission of road transport services in the North-East Area. The meeting felt that State monopoly would lead to increases in fares, deterioration in services, and a loss of the right of the travelling public to choose its own means of transport. No evidence had been produced to indicate that such a change would be in the best interests of the travelling public, and the Transport Act provided opportunities for objections to be raised by interested parties before the Minister of Transport made an Order for placing before Parliament.

* * * *

Standardisation of Locomotive Types

IT is the declared intention of the Railway Executive to pursue a policy of standardisation for future locomotive types, by which it expects to be able, by 1951, to produce the first of the new engines under a scheme that envisages no more than twelve standard types for all classes of work.

At first sight, this appears to be a very laudable object, and facile arguments which will commend the policy to the uninformed layman undoubtedly will be forthcoming, but it would be interesting to know how this State-planned locomotive Utopia is to be brought into being.

What value does the Railway Executive place on its present stock, numbering not far short of twenty-thousand locomotives? Is the intention to replace them all within a given period—a new five-year plan, for instance? Will the colossal cost of imposing yet a fresh departure from existing standards be taken into account? For, presumably, under the new standards which are being worked out, no type that now exists will be standard, and so accordingly will be marked down for early liquidation.

Sir Nigel Gresley, some twenty-seven years ago, when examining locomotive statistics of the former Great Northern Railway, found that the average life of a G.N.R. locomotive in those days was 33½ years. Most locomotive engineers would agree that that is a very fair figure, and would be largely applicable today; if anything, the effect of the 1939-45 war has been to prolong the life of locomotives, although many machines grossly overworked during that period now are being scrapped.

However, a life of 33 years can be envisaged clearly for a locomotive, though it will not necessarily spend all its life on the duties for which it originally was designed. The latest Swindon-built "Castle" and "Hall" classes, and the rapidly increasing 0-6-0 tank locomotives should be running until about 1982, in normal circumstances. Are they to have a life of, say, ten years under the new scheme and be replaced by 1960? If so, how can their continued construction be excused? If not, how can the future standardisation policy be justified? For if the policy is to be economically effective, it must be applied with a ruthless rigour, or the advantages which it is supposed to confer will never be apparent.

Some misgivings about the present situation undoubtedly exist, evidence of which is afforded by a most able and shrewd summing-up in a letter by Mr. F. A. S. Brown that appeared in the February 4, 1949, issue of *The Engineer*.

Mr. Brown's letter should be read carefully by every thinking man interested in the future of locomotive development in this country. It must suffice here to mention only one or two of the chief points which he makes. In the early days of the L.M.S.R., attempts were made to standardise certain locomotive types, yet these had become hoplessly outclassed within a very few years—long before the company had concluded its twenty-five years' existence. It is but seldom that locomotive engineers can make a clean sweep as Mr. Bulleid did on the Southern Railway; judging from his designs, there is a considerable break-away from his former chief, Sir Nigel Gresley—showing a psychological factor which Mr. Brown foresees as applicable to future locomotive designers of this country, working under the stultifying influence of a national committee. Progress in the past has been due to the work of many men, he writes, and nothing would stifle that progress more than a unified design centre. He considers that it would be much better if each Region could have its own committee and work out its own designs. Standardise components, but nothing more, is his suggestion; but to impose standardised designs on the railways of this country would be quite another matter, which is by no means certain to succeed. An ex-Great Western locomotive is now known to be a somewhat disappointing machine for the London-Leeds service, though on Western Region territory its performance is unsurpassed. Has anyone thought that if the projected standard types are to give efficient service, coal will have to be standardised to suit them?

Probably the best programme of standardisation ever carried out in connection with locomotives was that devised by Churchward in the early days of his superintendency at Swindon. He had to lay out the details of a scheme to which new construction could conform for at best a generation ahead, and yet the plan was capable of being put into immediate effect. At the same time, it was flexible enough to allow for certain changes from time to time, and so avoided any paralysing effect on progress in locomotive design. It is difficult to see how such a plan could go much further.

The present constitution of the Railway Executive makes it impossible to avoid the conclusion that matters of standardisation will be to the benefit of ex-L.M.S.R. locomotives and to the detriment of all others. As even a locomotive generalissimo cannot go on for ever, but will be succeeded sooner or later by another supreme designer, who may have ideas diametrically opposed to those of his predecessor, it is a matter for conjecture just how long the present proposed standardisation scheme will endure. After all, there was a good deal to be said for Sir Nigel Gresley's policy of perpetuating a number of locomotive types of the constituent companies of the L.N.E.R. and using them with great success in territories suited to them, whilst also devising new types which, within reasonable limits, were standard, and intended for general use over the system, as far as weight, loading restrictions, and other considerations, permitted. However, only about three or four Gresley designs really achieved anything approaching general distribution throughout the former L.N.E.R.—and that was in the days when railways were being run as profit-making concerns, not as nationalised undertakings.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Professional & Technical Staff

Eastleigh,
Hants. February 18

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In answer to Mr. Heady's letter, published in your issue of February 11, may I say that I am a member of the R.C.A. and appear to be standing almost alone in condemning the Railway Executive for its treatment of P. & T. staff, as our organised complaining has no effect on either the R.C.A. or the Railway Executive?

We have no other approach to the Executive than through the R.C.A. (? restrictive monopolists) and, although it is true that we have a representative on the R.C.A. Executive Committee, his is a lone voice and cannot hope to get a sympathetic hearing as none of the others has a technical background and, however sincere, can only examine our case in the light of his own non-technical experience.

Yours faithfully,
OLD ASHFORDIAN

The Problem of Railway Passenger Fares and Train Services

13, Outwood Drive,
Heald Green, Cheadle,
Cheshire. February 21

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—You will have seen the heavy fall in passenger traffic receipts for January, and though it is, of course, a matter of opinion, I personally feel that much of it could have been avoided by a far more vigorous cheap-ticket policy and a bigger policy of improvement of facilities within the limitations of the stock, etc., available.

I was interested indeed in the article in your issue of January 28 about passenger fares, and at first was tempted to write to you expressing certain views thereon. I felt, however, I had already spent too much time on this question (to my cost!), having tried hard, in different ways, but to little avail, for getting on for three years, to secure cheap-ticket facilities on an adequate scale to endeavour to stop the drift from the railways which obviously had set in.

I hope that you will go further into the matter with the much greater facilities and time available to you, as, though I may be entirely wrong, I feel it is one of the utmost importance, not only to actual passengers, but to the community at large.

Yours faithfully,
ERIC B. C. DYCKHOFF

Locomotive Standardisation

18, Wheatsheaf Close,
Woking, Surrey. February 4

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—May I first agree wholeheartedly with J. M.'s letter published in your issue of January 21. I agree especially with his remarks about locomotive standardisation; how can the number of locomotive classes ever be reduced to twelve? I very much doubt in any case if there is any real economy to be effected by having, say, one very large class of 1,000 locomotives instead of two large classes of 500 each. For instance, the three great mixed-traffic classes, the "Hall," the Stanier "Black," and the "B1," can muster over 1,250 locomotives, they are all likely to be with us many years yet, and each may prove to be the better engine under varying circumstances. Why not continue to build these fine locomotives, and thus, for instance, avoid Swindon having to keep spare parts for some quite foreign locomotive? In addition, such a policy would be more likely to ensure that locomotive development will move forward continually and not be under any encouragement to stand still.

I also give my full support to Mr. Boland's letter on diesel *v.* steam locomotives in your February 4 issue. I feel that the steam locomotive would not be taking such a back seat today if we only had a few more engineers in the world like Mr. Bulleid and M. Chapelon. On the same subject, if your current editorial note is any guide, the Council of Industrial Design seems to regard steam locomotives as something of the past best forgotten about. Steam locomotives are still a prominent export—let us hope a "Merchant Navy" or "Leader" class locomotive will find its way into the 1951 Exhibition.

Finally, may I comment on the new liveries? Assuming any change is necessary I find the new choices pleasant ones. I do not agree with your editorial comment that little public interest has been shown in the subject. As one who spends many hours a week in a train I can definitely say that passengers have shown every interest in the matter, even though they may not have found time to write to Marylebone Road about it! The large amount of correspondence that has appeared in your columns seems to support my view.

Yours faithfully,
J. B. LATHAM

Elastic Rail Fastenings

Aktieselskabet Holmenkolbanen
(The Holmenkol Railway Company),
Oslo. February 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—We have for some years used Macbeth spike anchors, and our experience with this elastic rail fastening is very satisfactory.

Owing to the steep gradient (maximum 5½ per cent.) and heavy curvature of many sections of our lines in conjunction with heavy traffic, the ordinary spikes work loose in comparatively short time. Also, screws lose their compact connection with the rail.

The Macbeth spike anchors, however, seem to be able to hold the rail in a solid and elastic grip. There have been no breakages of the Macbeth spike anchors in the track, although the temperature during the winter often is below 10° F. With specially constructed tools, the spikes are easy to place, and it is quicker to change a rail fastened with these anchors than a rail fastened with ordinary spikes or screws.

As the Macbeth spike anchors do not work loose in the sleepers, the hold for the spikes will not be destroyed. Due to this fact, and to the elastic connection between rail and sleeper, I think that the average life of the sleepers will be longer.

Yours faithfully,
T. SKJÆGGESTAD,
Chief Engineer

Efficient Braking of High-Speed Trains

London, N.21. December 31

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—On page 746 of your issue of December 31, 1948, you review the progress made in the restoration of the Rome-Milan main line of the Italian State Railways. This line, almost exactly equal in length to that of the East Coast route between London and Edinburgh, links the administrative and the industrial capitals of Italy, while the East Coast route links the capitals of England and Scotland, and the through passenger traffic over the two lines, though not the same in volume, is comparable. How refreshing therefore to see that the Italians intend the re-introduction of the 6-hr. express schedule between the cities, whereas any restoration of the high-speed services at home is frowned on. Italy has no shortage of permanent way staff, but the damage to this line must have been seen to be believed, and no small tribute is due to the management for its enterprise in restoring pre-war speeds.

The above is, however, rather a preamble to my main point, which is that the familiar argument against high-speed trains is their track occupation; the practice of the former L.N.E.R. was, I believe, to keep at least two sections ahead clear for high-speed trains, largely because of the great braking distances required from high speed. It is my contention that, given a four- or five-car diesel-electric set designed for high speed with high initial acceleration (at least 1·2-1·5 miles/ hr./sec.—a figure easily achieved if 50 per cent. of the axles are motored) and a modern form of compressed-air brake, two high-speed services each way daily from London to Edinburgh and London to Glasgow would dislocate neither the London Midland nor the Eastern-North Eastern Region timetables.

Of the two requirements named, the most important is efficient braking. In Great Britain today, the ordinary vacuum-brake train has a braking efficiency of only 5·6 per cent. from high speeds. (For those of your readers unfamiliar with the term, I would say that the "braking efficiency" of a train is "that percentage of the train's weight which if applied as a retarding force to the train will stop it in a certain *distance*." This can be expressed as a formula in the form $s = \frac{3{\cdot}34V^2}{e}$, where s = stopping distance, V = speed of train in m.p.h. and e = braking efficiency.) The maximum retarding force which can be used is limited by the adhesion of the train, and where all wheels are braked a limit of about 16-18 per cent. is obtainable on a greasy rail. However, the time taken

to apply the brake, and the safety margin necessary to avoid picking up the wheels, usually reduces the effective braking efficiency to between 10-12 per cent. Taking the lower of these limits it will be seen that this is vastly better than the 5-6 per cent. obtained on the normal vacuum-brake train.

The Westinghouse compressed-air brake, especially when in its more modern forms, combined with the electro-pneumatic brake or combined with a straight air brake, and when fitted with some form of "retardation control" so that higher cylinder pressures are obtainable at the higher speeds when brake block friction is less than at low speeds, is admittedly a more expensive piece of equipment and requires more careful maintenance than the vacuum brake, but these factors have not deterred London Transport from adopting one form of it.

In addition, the plain Westinghouse brake system is known to all old "Brighton" people, to all Eastern Region (G.E. suburban) people, and to all Southern Electric people, and it is used wherever really rapid and effective braking—with a quick release to prevent delays—is needed, so that its use in Britain on high-speed trains would be hardly revolutionary. By efficient braking and acceleration the maximum speeds required for a 6-hr. schedule to Edinburgh probably could be kept well below 95 m.p.h. and sure braking in one section attained, so obviating heavy track occupation.

I must apologise, Sir, for the length of this letter, but braking is a subject about which we hear too little—if we heard more, there would be less talk about the need for quadrupling, or of restricting the speed of express trains.

I append a short table showing the braking distances required with braking efficiencies of 6 per cent. and 10 per cent.—giving the vacuum the best of the doubt and the compressed air the worst.

TABLE OF BRAKING DISTANCES

Speed of train	Stopping distance Distance in ft. at 6 per cent. br. eff.	Distance in ft. at 10 per cent. br. eff.
100 m.p.h.	5,570 ft.	3,340 ft.
90 m.p.h.	4,500 ft.	2,700 ft.
80 m.p.h.	3,720 ft.	2,140 ft.
60 m.p.h.	2,000 ft.	1,200 ft.
40 m.p.h.	890 ft.	535 ft.

Because of my employment I beg leave to sign, Sir,

Yours faithfully,

TECHNICAL ASSISTANT

Re-Routing of Express Trains

Kings College,
Cambridge. February 2

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Much of the free timekeeping on main lines today can be attributed to congestion, both on route and at the termini. This can be partly overcome by the re-routing of certain trains from the most congested lines. London termini which are incapable of dealing satisfactorily with their present volume of traffic include Liverpool Street and Euston. To improve this state of affairs I suggest greater use be made of Marylebone, St. Pancras, and Broad Street Stations.

First, certain traffic now running from Cambridge and north thereof to Liverpool Street could be run just as easily into Kings Cross *via* Hitchin, or even St. Pancras *via* Tottenham. The line from Cambridge to Liverpool Street is unsuited to both heavy locomotive and maximum speeds of over 60 m.p.h. It is hoped that the present speed restriction imposed on Pacifics and "V2s" between Hitchin and Cambridge will be lifted soon to enable considerably faster schedules to be introduced than those at present in operation between Liverpool Street and Cambridge. The Cambridge buffet expresses could be extended to Norwich, Bury St. Edmunds, or Hunstanton. The intermediate stations between Cambridge and Kings Cross could be used as at present by outer suburban trains terminating at Cambridge. This reorganisation would leave the Liverpool Street—Cambridge line free to carry the March—Temple Mills freight trains, together with stopping and semi-fast passenger trains terminating at Cambridge.

The increased traffic proposed for Kings Cross could be offset by the diversion of certain expresses between Edinburgh, the North-East, and London from Kings Cross, to Marylebone and St. Pancras, by way of Sheffield. This would give an improved service between the Midland towns and both Scotland and London. There would still be the fast services for Edinburgh to Kings Cross for through passengers to London. A welcome addition would be an express from Kings Cross to Glasgow Central, or Perth, calling at Peterborough North (for Eastern Counties), Doncaster, Leeds City, and Carlisle.

The diversion of traffic from the L.M.R. Western Division main line presents a problem of greater magnitude. Nevertheless, similar principles could be applied here. The Manchester—Euston trains could run instead from Manchester Central Station to St. Pancras *via* Derby, conveying through carriages from Stoke. Expresses from North Wales could run over the Western Region from Chester to Paddington or Marylebone, and all Wolverhampton and Birmingham expresses also could be transferred to Paddington or Marylebone. Coventry could be catered for by running certain existing express trains from Crewe to London *via* Nuneaton, Coventry, and Rugby, or alternatively, by operating through carriages to Euston from Coventry *via* Rugby.

Under this reorganisation it would not be necessary to run express trains between Euston and Wolverhampton, Manchester, or North Wales, so leaving the Western Division main line free for traffic between London and Liverpool, Blackpool, Glasgow, the Lake District, etc., areas which are not served by a reasonable alternative route.

During the peak periods of the day Euston might be eased further by the termination of certain essentially business trains at Broad Street, a much more convenient station for the city.

Yours faithfully,

H. N. A. SHELTON

Contact between Railway Officers and Staff

March 2

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Writing as one who is now agent at a medium-size depot, and who in recent years has had many opportunities of getting around amongst the men at the station, I should like to echo the cry of your issue of February 18 for more contact between railway officers and the staff.

It is not generally that these officers are unaware of the need for such personal contact, but, as you suggest, other demands made on them and their immediate assistants prevent them from making the journeys which such contact requires. Were I to recount some examples which I have found continually in recent years (since I returned from war service) of lack of personal contact between District Officers—for they must bear the brunt—and stations and station staff, they would astound even you, I think, aware as you evidently are of the lack. Because of it, the work of the stationmaster and agents, the immediate leaders of the men, is made far more difficult than it should be, and those in higher places become the invariably antagonistic "they" in the eyes of the staff.

I could not suggest that District Officers themselves should, or could, visit every station at frequent intervals so that they should see and know every member of the staff. I do feel most strongly, however, that each of them should have a personal assistant, devoid of sectional responsibility, who should be his means of close contact with those below. I would prefer, should you print the above, that my name and address be omitted. My views might be construed a criticism of my superiors in a direction which might not be appreciated.

Yours faithfully,

STATION AGENT

"Through Great Central Eyes"

Gorst Hills Cottage, Little Sutton,
Wirral, Cheshire. March 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—As an old G.C. man and proud of that designation, I was intensely tickled by the article under the above heading which appeared in the current issue of *The Railway Gazette*. It is a misfortune that no authentic history of the "Becky Sharp" of the old railway companies before grouping has ever been written, because, with its rather unusual and pronounced characteristics, the old Great Central Railway certainly deserves some permanent record to prevent its memory passing into oblivion.

Coming so late into the field when the other railway companies had reached the age of respectability, the Great Central had perforce to live by its wits, and by its forceful publicity methods endeavoured to find compensation for the handicap of its longer routes to the majority of the places served. Apart from the rather crude naïveté of its pictorial posters, the old G.C. was always fertile with new ideas, and the effective use of maps on posters showing cross-country journey timings might well be emulated by our Railway Executive.

If my memory serves me right, the G.C. publicity department produced shortly before the 1914-18 war a remarkable volume entitled *Per Rail*. This was written in the rather florid style typical of the period and some copies must still be available in the archives of the Eastern Region. I feel sure a further article with the inclusion of some extracts from that publication might again add to the gaiety of your ever-admiring readers.

Yours faithfully,

GERALD LEEDAM

The Scrap Heap

A man, his wife, and two small children spent two days and nights in New York underground trains after being evicted from their home.—*From "The Star."*

* * *

AMERICAN AIR AND RAIL FARES

National Airlines' passengers will be able to buy round-trip tickets between 14 Florida cities and northern points between May 15 and November at only one-third more than present one-way fares. The rate is substantially lower than railroad Pullman fares.—*From "The Aeroplane."*

* * *

100 YEARS AGO

From THE RAILWAY TIMES, *March* 10, 1849

RAILWAY ACCIDENTS.—It appears from a return just issued that the number of passengers conveyed on all the railways in Great Britain and Ireland during the half-year ending the 31st of December last was 31,524,641, there were three passengers killed, and 68 injured, from causes beyond their own control; 7 passengers killed and 5 injured, owing to their own misconduct or want of caution; that 6 servants of companies or of contractors were killed, and 18 injured, from causes beyond their own control; and 73 servants of companies or of contractors killed and 24 injured, owing to their own misconduct or want of caution; that 23 trespassers and other persons, neither passengers nor servants, were killed, and 5 injured, by improperly crossing or standing on the railways; making a total of 112 killed and 120 injured. The number of miles of railway open on the 30th of June, 1848, was 4,357; and on the 31st of December, 5,007, showing an increase of 650 miles during the six months.

* * *

BAD FOR BIRMINGHAM

They had just finished serving after-lunch coffee in the crowded dining-car of the 10.10 a.m. train from Birmingham to Euston.

Waiters were writing out the diners' bills as the train slipped smartly through Watford.

From his seat by the window the Rev. Charles Augustus Herbert Lowe, 59-year-old Rural Dean of Smethwick, Staffordshire, rose as though to say Grace.

But instead he said: "Ladies and gentlemen, would anyone like to support me in the opinion that we have had a very poor lunch today?"

Eyebrows were raised. There was an embarrassed silence. It was broken by a passenger at the far end of the coach. One by one the diners rallied until 20 of them were standing.

Harrow Weald hove in sight. The Rural Dean called for the chief dining-car attendant. He told him: "We consider we have had a very poor lunch."

The attendant apologised. He said: "It is always a poor lunch when Birmingham supplies it."

This story was told by the Rural Dean in a letter to his local paper.—*From the "Daily Mail."*

We think the restaurant-car conductor merited a prize for his ready reply. It reminds us of a piece of equally quick repartee by the late Inspector Thomas when the lights failed in the saloon. Mr. William Whitelaw, then Chairman of the North British Railway, who was a guest of the G.W.R., said: "This doesn't happen in Scotland." "No, Sir," replied Inspector Thomas, "I expect you use candles!"

Lord Inman has written to the Rev. C. Lowe to tell him why his lunch in a Birmingham-Euston diner was poor. The day, he explained, was Monday.—*From the "Daily Mail."*

FEWER CIVIL SERVANTS

In the last three months of 1948, the total number of civil servants fell by 4,506, the main decreases being in departments dealing with national insurance, labour, fuel and power, and trade. The total number of civil staff in all Government Departments, which includes non-industrial civil servants on defence work in the Ministry of Supply, was 706,548.

* * *

A correspondent writes: "Have you also noticed that cars registered in Cambridge County are now G.E.R., very appropriate. Again I am glad to see West Riding cars with G.W.R. on; bit out of location, but it is pleasing to see the famous letters again. Leeds City is giving us L.N.W. at the moment, and M.R. is available for Wilts County, and that Southampton C.B.C. will soon use G.C.R."

* * *

THE MOST POPULAR CAR IN AMERICA

The Gyles House,
Pittenweem,
Fife. October 12

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Am enclosing an advertisement for the A.A.R. which appeared in *The New Yorker* of June 5 last. I think you will agree that this is clever advertising and it occurred to me that you might like to reproduce it in "The Scrap Heap."

Yours faithfully,
G. RICHARD PARKES

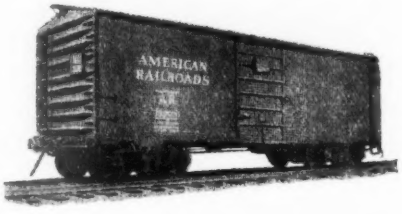
NATIONAL EVENT

The first anniversary of the purchase by Argentina of former British railways in the country was celebrated on March 3 in Buenos Aires with a speech by Señora Peron, and the unveiling of a commemorative plaque.—*From "The Manchester Guardian."*

* * *

THE CHANGING FACE OF THE SOUTHERN

The paper which Mr. R. A. Savill presented recently to the British Railways (Southern Region) Lecture & Debating Society, under the above title, has caused many enthusiasts for the pre-grouping constituents of the former Southern Railway to search their records with a view to amplifying the admirable schedules of dates that Mr. Savill's industry produced. As our own contribution, we publish on the opposite page, a map of the suburban system of the London, Brighton & South Coast Railway as it existed just before the 1914 war. This was prepared in response to a request from a number of readers when we issued a chronological map of the main-line system of this railway, in our issue of September 21, 1945, at a time when the Southern Railway was celebrating a whole series of local centenaries. Although research work for the suburban map was completed, space considerations had precluded its publication, particularly as no centenary was celebrated within this area to give it topical interest.



The most popular car in America!

YES—the familiar, hard-working railroad freight car!

You almost live out of it! You depend upon it for virtually everything you eat, everything you wear, everything you use.

Freight cars are owned by many different railroads all over the country—and yet all of them can run on any railroad, carrying anything, anywhere, in any season.

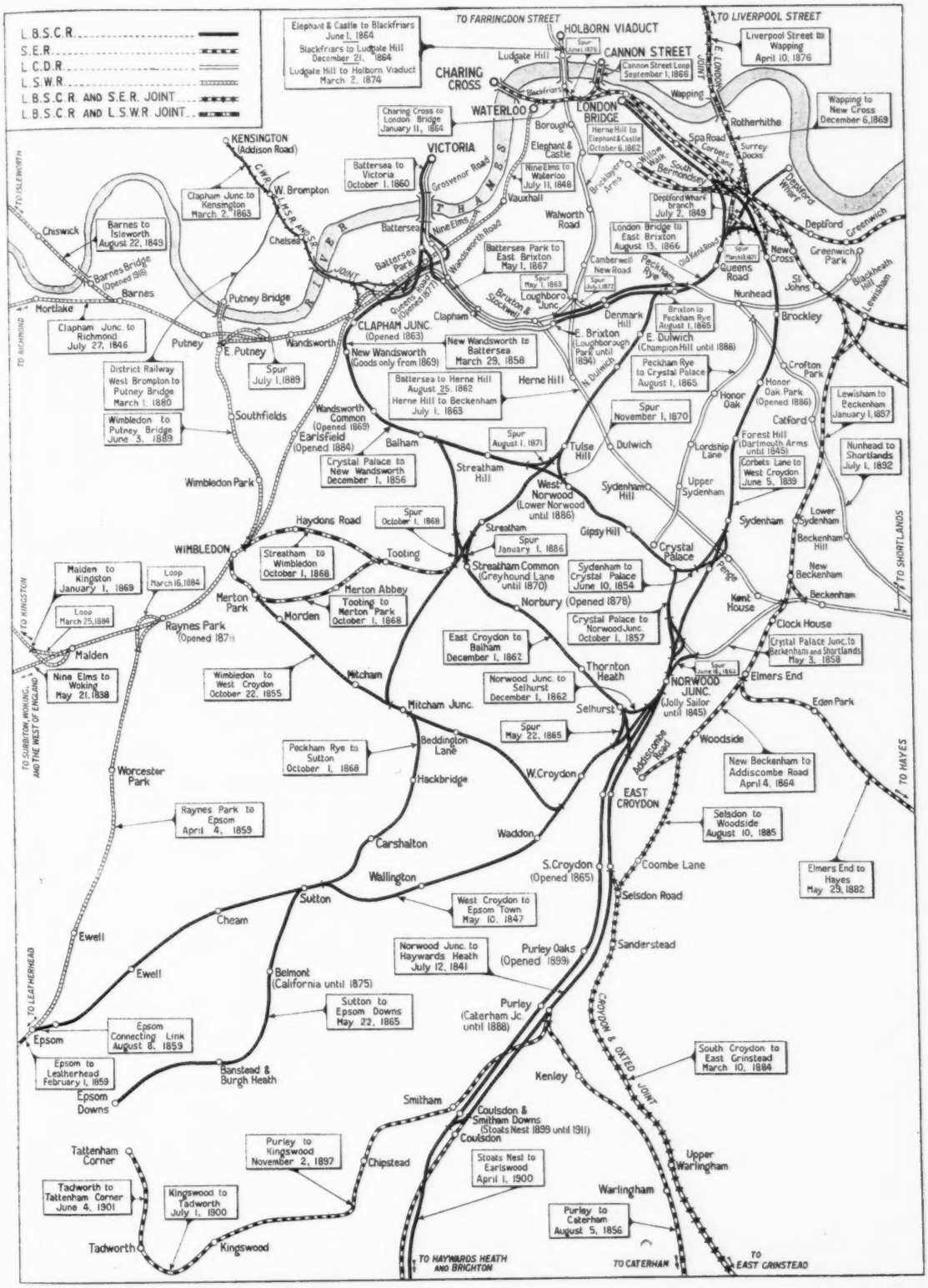
Take this boxcar, for example. The brother of every other American freight car, it has interchangeable wheels, axles, trucks, brakes, draft gear, and couplings. It fits into any train, and can be repaired with standard parts at any railroad shop in America.

This universal interchange of free-wheeling freight cars is the basis of the mass transportation that makes possible the marvel of American large-scale production. It is the very foundation of our system of marketing, which gives the American consumer the widest possible choice in the things he buys.

These things could not have been achieved—and they could not be maintained today—without the cooperation of railroads which, while competing vigorously with one another, also work together through such organizations as their mutual agency, the Association of American Railroads. And today—as in the past—they are engaged in a wide-range program of research and development in equipment, materials, and methods, to help maintain American railroads as the most economical, the most efficient, the safest mass transportation system in the world.

ASSOCIATION OF AMERICAN RAILROADS
WASHINGTON 6, D.C.

Evolution of the Brighton Railway Suburban System



Chronological map showing the development of the suburban system of the London, Brighton & South Coast Railway (one of the constituents of the Southern Region) and adjacent lines. The main-line system formed the subject of a similar map in our issue of September 21, 1945

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Financial Position

So far, only two months of the current financial year have shown a surplus. The first month, April, 1948, yielded a surplus of £130,228, and November, the latest month for which figures are available, a surplus of £83,740. The months May to October, 1948, all had deficits on working.

In November, the revenue totalled £7,783,827, and expenditure, excluding net revenue appropriations, amounted to £7,658,991. At the end of the seven months ending November 30, the accumulated deficit amounted to £1,921,471, as compared with £91,460 for the corresponding period of the previous financial year. For November the railways had a deficit of £204,671, but harbours, steamships, and airways had surpluses of £222,905, £807, and £107,074 respectively. Aerodromes recorded a small deficit of £1,279.

Taking railway working alone, the total accumulated deficit now amounts to £3,254,015, but this is offset by surpluses of revenue over expenditure in the case of harbours and steamships.

New Electric Running Sheds at Braamfontein

The first step towards the eventual withdrawal of steam locomotives from the central Witwatersrand area (between Langlaagte and Germiston), and the full introduction of electric traction through Johannesburg Station, has been taken with the erection of the new electric running sheds and workshops at Braamfontein. The building, which occupies more than four acres, has been erected on the site of the old railway institute sports ground to the south of the present steam locomotive running sheds, where it is conveniently situated to provide easy access to the main line and suburban tracks through Johannesburg Station.

It is divided into four sections, consisting of the running shed, workshops, and stores. The running shed is 718 ft. long to enable it to accommodate a full-length suburban train of eleven coaches. There are six tracks running the length of the shed, so that six trains can be stabled simultaneously. The repair shed and workshop, which are separated by a line of pillars, are each 605 ft. long and 75 ft. wide. Both are of modern design with up-to-date lighting and power installations, and are to be equipped with the latest type of plant and machinery. The store rooms adjoin the workshops.

Until the arrival of the electric rolling stock necessary before the complete changeover from steam to electric traction can be made, the sheds are being used for the painting and general preparation of new coaches as they are received. A cargo of 29 new motor coaches is being shipped. It is hoped that the running sheds will be brought into operation about the middle of this year.

Airways Services

The total number of sectional services operated in the Union and South-West Africa during November, 1947, was 892. By the end of 1948 this monthly total had risen by more than 35 per cent. to 1,223. The corresponding number of passengers carried by internal services increased from 9,933 for November, 1947, to 11,986 for November, 1948. The total number of passengers carried over all routes—trunk, regional, and internal—by South African Airways during 1946-47 was almost double that for 1945-46.

The volume of traffic offering on several internal services has shown an upward tendency and in many instances the additional demand for accommodation has been met by increasing the frequency of the services.

PAKISTAN

Rolling Stock

The stores ordered by the Pakistan Railways Purchase Mission, which went abroad some time ago, have begun to arrive. The railways can now look forward to a better maintenance of their locomotives and to the much-needed and long-overdue rehabilitation of their coaching stock.

The North Western Railway rolling stock programme for next year includes the provision of a hundred new coaches. The new stock will be wider and will be built as complete rakes for the Pakistan Mail which runs daily between Karachi and Peshawar *via* Lahore.

Inter-Dominion Traffic

Whereas there has been no cessation of rail traffic between Eastern Pakistan and India, the rail traffic between Western Pakistan and India continues to be restricted and confined to goods. The proposal to resume passenger traffic between the North Western and the East Punjab Railways has not been agreed to so far by India. Another link between Western Pakistan and India *via* the metre-gauge section of the North Western Railway and the Jodhpur Railway also has not been functioning for many months. Efforts to resume traffic by this route are being made.

During January, 1949, the goods traffic which was interchanged between the North Western and the East Punjab Railways amounted to some 2,500 wagons. The volume of traffic coming to and going from the North Western Railway was nearly the same. The bulk of the incoming traffic was coal, while limestone, cotton seeds, and salt formed the bulk of the outgoing traffic.

INDIA

Block Trains

In their campaign for improved operation the railways have been extending the handling of goods traffic in block trains, that is, through train loads from point to point.

In December, 1948, 329 block trains were run on the broad gauge. Special goods trains were run formerly for transporting military stores and foodstuffs; now they are being used to carry a variety of raw materials and finished products between producing and consuming centres. In this way, not only is better use made of stock by avoiding delay *en route*, but a welcome relief is afforded to marshalling yards, many of which are having to handle traffic in excess of the capacity for which they were designed. The Railway Board has advised programming of train loads whenever transport facilities are centrally planned. This has given good results in the movement of iron and steel, textiles, and cement.

Block trains have been not only a means of speedy and economic operation, but also of redressing, to some extent, shortages of consumer goods in urban centres. Since the war, loading of full wagon loads has been governed by priority schedules which usually favour coal, foodstuffs, Government-sponsored items, and raw materials or products of large-scale industries. Small traders and industrialists have been at a disadvantage and town dwellers have had to pay high prices because of local shortage of articles in common use, but not high enough in the priority schedule to qualify for easy movement by rail.

Recently, most railways have begun weekly goods train services between important towns. Loading for these trains, whether in wagons or smalls, is untrammelled by the priority schedules, though all consignments must be dispatched through to the destination of the block train. The movement of smalls in block trains from point to point without the expense and risks of handling *en route* is advantageous not only to the railways, but also to the small trader or manufacturer who is assured of a speedy and safe movement.

A weekly goods train which runs from Shalimar to Vizagapatam on the Bengal-Nagpur Railway is styled characteristically "The Merchants' Own Special." Some other weekly goods specials are: Wadi Bunder to Nagpur, Jubbulpore, and Kanpur (G.I.P.R.); Bombay—Ahmedabad (B.B.C.I.R.); Howrah Goods to Kanpur and Delhi (E.I.R.); Howrah Goods to Patna (fortnightly) (E.I.R.); and Shalimar—Bombay (B.N.R.).

CANADA

Taxation in Saskatchewan

Further to the report in our January 14 issue the Saskatchewan Court of Appeal has granted Saskatchewan municipalities the right to collect taxes in $9,000,000 worth of additional railway property. Roadways, lands, buildings, and business of the Canadian Pacific Railway along 416 miles of main line and 1,603 miles of charter branch lines in Saskatchewan are ruled taxable.

The Court of Appeal held that urban and rural municipalities can levy property and business taxes on the C.P.R. branch lines and business taxes on the main lines. It also ruled that five amended provincial statutes—the village, city, town, rural municipalities, and local improvement districts—legally empowered municipalities to levy the taxes. The C.N.R. did not claim exception.

UNITED STATES

New Cut-off Line for the Burlington

The Chicago, Burlington & Quincy seeks incorporation of a company, to be called the Kansas City & Brookfield, to build a 45-mile line which would shorten the Chicago—Kansas City route of the Burlington by 23 miles. The Burlington proposes to use Wabash Railroad tracks for 12½ miles to gain the new line, which will connect with a C.B. & Q. branch to be shortened, by which it will regain the original main line.

The new route would reduce the running time of night passenger trains between Chicago and Kansas City by some 2½-3 hr. and permit operation of daytime "Zephyrs" leaving the two cities at noon and arriving at destinations by 7.30 p.m.

Modernisation of Pittsburgh Station

The directors of the Pennsylvania Railroad have authorised the second stage, costing $6,000,000, in the $20,000,000 project of remodelling Pittsburgh Station. This stage includes extension of station tracks, and construction of new platforms, a new exit, and a taxicab loading station. The first part of the programme, costing some $2,000,000, is nearing completion. It involved removal of the old roof and many track alterations. Future work includes the provision of a lower concourse, with moving stairways, modernisation of the outside rotunda leading to the main entrance of the station, and renovation of waiting rooms.

GERMANY

New Long-Distance Expresses

Forty-six additional long-distance expresses are to be introduced in western Germany on May 15 with the summer timetable. A new fast train will link Paris with Prague running by way of Strasbourg, Kehl, Stuttgart, Nuremberg, and Schirnding.

A new night train to be put on will improve the connection between western Germany and Brussels *via* Cologne and Aachen. Another new night train is to be instituted between Munich and the Netherlands *via* Stuttgart, Heidelberg, Mannheim, Mainz, Cologne, Düsseldorf, Emmerich, and Arnhem. A new train is to operate between Munich and Rome *via* Kufstein and Innsbruck, and through carriages are to be introduced between Munich and Trieste, and will connect at Trieste with services for and from Jugoslavia.

New trains between Stuttgart and Zurich (*via* Schaffhausen) and Munich and Zurich (*via* Lindau) are to improve the connections with Switzerland. The Scandinavia—Switzerland express (*via* Karlsruhe and Basle) will carry through coaches and sleeping cars between Stockholm and Rome, as well as between Copenhagen on the one hand, and Rome and Chur on the other. In addition, the same train is to include through coaches and sleeping cars between Hamburg and Vienna, thereby improving the connection for and from Budapest. A large number of "lying-down" third-class coaches known as *Liegewagen* will be introduced on night trains between towns in western Germany.

FRANCE

Reconstruction of Bridges and Tunnels

Despite the progress of reconstruction there are still some 500 destroyed bridges, viaducts, tunnels, etc., replacement of which by temporary structures is yet to be taken in hand. In addition, 103 devastated sections of lines have still to be restored to serviceable condition. The whole of this reconstruction work will take some four years and require an expenditure of about fr. 15,200 million.

U.S.S.R.

Reconstructed Steam Locomotives

The Krasnoye Sormovo locomotive works at Gorki recently completed the reconstruction of two Su-type steam locomotives, a 2-6-2 express type built by the Kolomna locomotive works in 1926. They have been fitted with mechanical stoker and other refinements. The original weight in service was 137·8 *tonnes*. More of these locomotives are to be reconstructed and modernised if the trials with the two reconstructed are satisfactory. The reconstructed class will be designated "Sur."

Railway Industry in Buryat-Mongolia

From a recent official report it appears that the railway industry in the autonomous republic of Buryat-Mongolia (to the east of Lake Baikal) is progressing. The republic is crossed by a section of the trans-Siberian line between Irkutsk in the west and Chita in the east, and from its capital, Ulan Ude (formerly known as Verkhne Udinsk) a line runs south to Kiakhta and Outer Mongolia. The 1948 output of main-line locomotives of the Ulan Ude locomotive and wagon works was 35 per cent. above that of 1947, and it is expected that the target set for 1950, the last year of the current Five-Year plan, will be fulfilled by the end of 1949.

Publications Received

Gas Welding and Cutting. A Practical Guide to the best Techniques. By C. G. Bainbridge. London: Iliffe & Sons Ltd., Dorset House, Stamford Street, S.E.1. 8¼ in. × 5½ in. 305 pp. Illustrated. Price 15s. net.—This is a comprehensive survey of the art and science of gas welding. The book is not intended to be a review of the industrial applications of welding and cutting, except where particular points of procedure are demonstrated, and more attention has been paid to the provision of instructive illustrations. There are 183 drawings and photographs of welding instruments and processes. The 10 chapters cover such essential matters as gases and equipment, combustion and fusion, welding of castings, rebuilding worn parts, pipe welding, oxygen cutting, the examination of welds, care of equipment, and safety precautions. A useful Appendix contains 54 conversion and other tables. The author is examiner in oxy-acetylene welding for the City & Guilds of London Institute.

British Railways Holiday Guide (Southern Region).—The Southern Region has the advantage of serving numerous coast resorts, large and small and widely differing in attractions, which are accessible easily from London and the Midlands. It is the excellent train services provided for many years which have contributed materially to their rise, dating from the opening of the London & Brighton, the first railway to link London with a popular watering-place. Despite their nearness to Town, the rural beauty spots of Kent, Surrey, and Sussex have preserved their charm. Beyond lies the Isle of Wight, a synthesis of all that is loveliest in South Country scenery, and Bournemouth, truly a garden city by the sea—both reached in under three hours from Waterloo. "Southern" resorts in Devon, Dorset, and Cornwall are fully described in this edition, and the guide contains complete details of fares and accommodation.

British Railways Holiday Guide (Western Region).—This guide follows the lines of its Great Western predecessor in its general format; indeed, many of the descriptions and photographs are unchanged from the last edition of "Holiday Haunts." The new edition contains 584 pages of photographs, short descriptions of coast and inland resorts, and addresses of hotels and other holiday accommodation in the Western Region, which includes Cornwall, Devon, Somerset, Dorset, the Channel Islands, Gloucestershire, Berkshire, and South and Central Wales. The descriptions are by Maxwell Fraser, F.R.G.S. The usual "Holiday Haunts" data, comprising a list of fares, a map of British Railways, and sectional maps of the holiday areas, have been retained.

Iron and Steel: The Master of Them All. By "A User." London. The Falcon Press (London) Limited, Crown Passage, Pall Mall, S.W.1. 8½ in. × 5½ in. 42 pp. Price 2s. 6d.—This booklet was written originally in the form of a series of short lectures for apprentices in a large British engineering works and is sub-titled: "Some Elementary Observations on Iron and Steel; on the Iron and Steel Trade; and on its History and Present Position in Great Britain." The author traces the development of the industry from its earliest days and describes in an interesting way the great advances made in smelting and rolling processes since the beginning of the Industrial Revolution.

The final chapter is a cogently reasoned and objective criticism of nationalisation both as a general policy and with particular reference to the iron and steel industry. It is pointed out that "whether it is proved a good or bad thing to nationalise the steel and other industries remains to be seen, but at the present time, at a stage in our history when all our efforts must be essentially devoted to mere survival, to introduce a difficult, entirely unproved and contentious measure would seem to ordinary common-sense people, who badly need their standard of life to be improved, to be the height of unwisdom."

Mullard World Review.—Mullard Electronic Products Limited has issued the first number of a new export magazine, *Mullard World Review*. It is the first export journal produced by this firm and is intended to form a link between its headquarters in London and its overseas representatives. The contents include descriptions of the firm's main factory at Mitcham, Surrey; and the new Mullard 9-valve 12 waveband receiving set. There is an article on the miniature valves, each only one-third the size of a cigarette, designed for the Medical Research Council's hearing aids for the deaf. Mullard was given the Government contract to supply 400,000 valves for these instruments.

British Railways Holiday Guide (Scottish Region).—This is the first railway handbook to cover all Scotland, formerly split between the old L.M.S.R. and L.N.E.R. guides. Grandeur of scenery is the quality most associated with Scotland, but the lowlands have no less interest for the tourist. Scotland and golf are synonymous, and the golfer will find in these pages full information about courses. The hospitality of the Scots in proverbial, and the traveller will receive it as surely in the fine British Railways hotels in the large cities and tourist centres as in the humblest Highland inn. The cities and towns boast a wealth of old buildings, culminating in the noble monuments of Edinburgh. A particularly fine selection of illustrations and full information on accommodation accompany a most readable text.

Modern Motive Power on the C. & O.

Twenty-five years of locomotive development from the first large order for high-power Mallets with simple-expansion cylinders, to recent orders for the 2-6-6-6 "*Allegheny*" *type*

By E. C. Poultney, O.B.E., M.I.Loco.E.

4-6-4 *passenger locomotive, rebuilt from a Pacific at the Huntington shops.* 1946-7

UNDER the well-chosen title, "A Lively American Railway," an interesting account appeared in *The Railway Gazette* of January 23, 1948, of recent activities of the Chesapeake & Ohio Railway, and in doing so, called special attention to the enormous freight traffic, principally coal, operated by this remarkable railway system. To move a total of some 72,000,000 short tons of coal in one year and work 25,380 net ton-miles per route-mile of track per day rightly was regarded as an astonishing record for a railway over 3,050 miles in length and, in view of this outstanding performance, it is thought that it would be opportune for some notes to be presented on the steam motive power used to operate this vast traffic.

The more modern locomotives working the principal passenger and freight services on the main lines of the C. & O. comprise the following types:—

Mallet	...	...	2-8-8-2	Simple expansion
,,	...	...	2-6-6-6	,, ,,
Freight	...	...	2-10-4	
,,	...	...	2-8-4	
Passenger	...	...	4-8-4	
,,	...	...	4-6-2	
,,	...	...	4-6-4	

Simple-Expansion Mallets

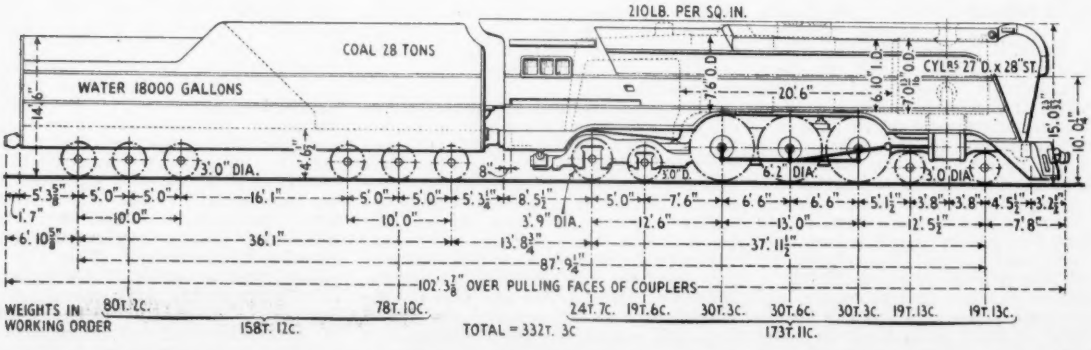
The C. & O. long has been in the forefront in the development of the steam locomotive, and when, in 1924, the American Locomotive Company delivered twenty-five large 2-8-8-2 simple-expansion Mallet engines, a notable record was established, for, not only was this the first large order placed for high-powered Mallets with simple-expansion cylinders, but also, as subsequent events have shown, these engines inaugurated a design that since has been increasingly used by many of the great lines in the United States.

Hitherto, the Mallet design had been associated with the use of compound cylinders; however, as the power of compound engines is set by the permissible size of the low-pressure cylinders, clearance limitations on some railways restrict the capacity obtainable with this type. It is for this reason, therefore, that simple-expansion cylinders were suggested for the C. & O. Mallets, designed to comply with restricted clearances and to provide much greater power than the existing compound Mallets having h.p. and l.p. cylinders 22 in. and 35 in. dia. by 32 in. stroke. A further reason for the introduction of simple engines was the desire to operate heavy trains at higher speeds, while, as practically all this traffic has to be worked over the Allegheny Mountains, a high tractive force was a prime consideration.

The new engines, with four 23 in. by 32 in. cylinders, 4 ft. 9 in. wheels, and steam at a pressure of 205 lb. per sq. in., developed a rated tractive force of 103,500 lb., comparing with 74,000 lb. for the compounds. The boilers, of considerable size, have a total of 8,328 sq. ft. of heating surface and a grate area of 112·9 sq. ft. When constructed, they were said to be the longest ever turned out of the maker's Schenectady works, the length being 56 ft. 11⅛ in. from the front of the smoke-box to the rear end of the firebox foundation-ring. In addition to the initial engines, the design later was repeated by the Baldwin Locomotive Works.

Originating from a desire to improve the operating conditions of heavy coal-trains between Russel, Kentucky, and Toledo, Ohio, the C. & O. in conjunction with the Lima Locomotive Works, designed a large 2-10-4 engine, 40 of which were built by Lima in 1930. These were built specially to work very heavy trains from Russel through to Toledo, a run of 236 miles, and at the same time improve on the work being done by the Mallet engines. The design was evolved after a number of trials had been made during 1929 and 1930, with one of the simple-expansion Mallets and a 2-8-4 engine, a design comparatively new at that time, which because of the satisfactory results being obtained in heavy-freight traffic, was attracting considerable attention.

The large boiler capacity, made possible by the provision of a trailing four-wheel truck allowing a large firebox and grate area, added to the power available with eight-coupled wheels at fairly high speeds. By fitting a booster to operate the trailing



Outline drawing showing principal weights and dimensions of the Pacific locomotive rebuilt as a 4-6-4

axle of the hind truck, a considerable tractive force was available when starting a heavy train.

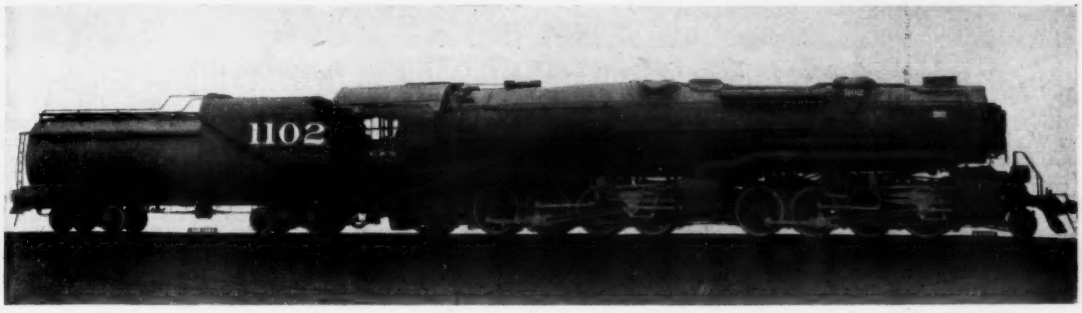
The 2-10-4 engines were, in fact, a development of the 2-8-4 design; the extra pair of coupled wheels, however, added to the maximum tractive force and gave the added support required for a larger boiler. Trials carried out with the first engine showed that a train of 141 cars having an actual weight of 10,939 tons, could be worked over the line at a mean speed of 21·7 m.p.h. on a coal consumption per gross ton-mile, of 0·30 lb. and 3·37 lb. per d.b.h.p.

With cylinders 29 in. by 34 in., 5 ft. 9 in. coupled wheels and a steam pressure of 260 lb. per sq. in., the rated tractive force is 91,584 lb., increased to 106,584 lb. by the booster driving the trailing axle of the rear truck.

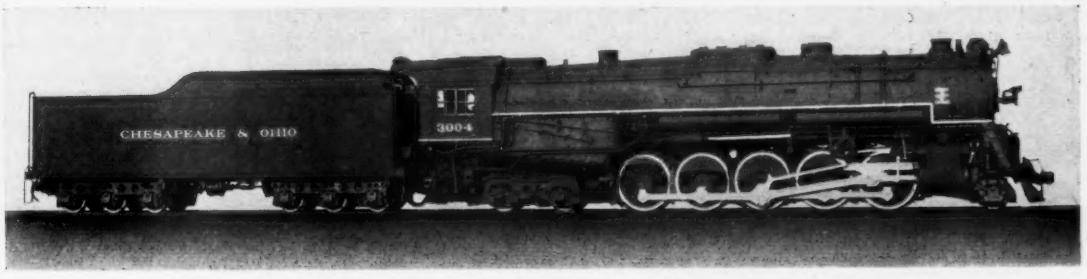
Thus, so far as tractive force was concerned, the 2-10-4 engines fully equalled the Mallets, and the large grate area of 121·7 sq. ft. ensured good steaming and high power-output. With ten coupled wheels, the driving wheelbase of 24 ft. 4 in. was considerable, but, by allowing lateral movement for the leading and trailing pairs, the rigid wheelbase was only 12 ft. 2 in.

"Greenbrier" Passenger Type

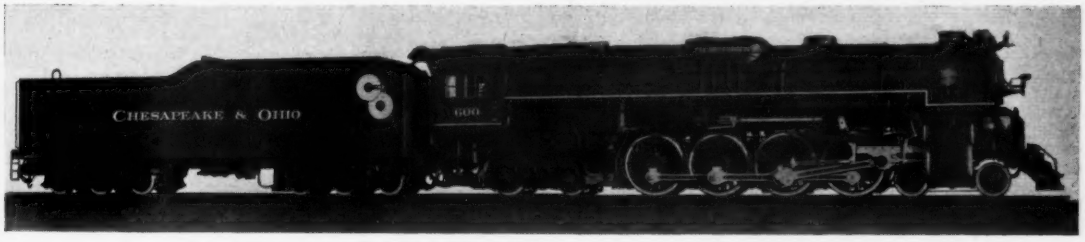
To meet a demand for increased motive power for working heavy passenger-trains, particularly over the Allegheny and



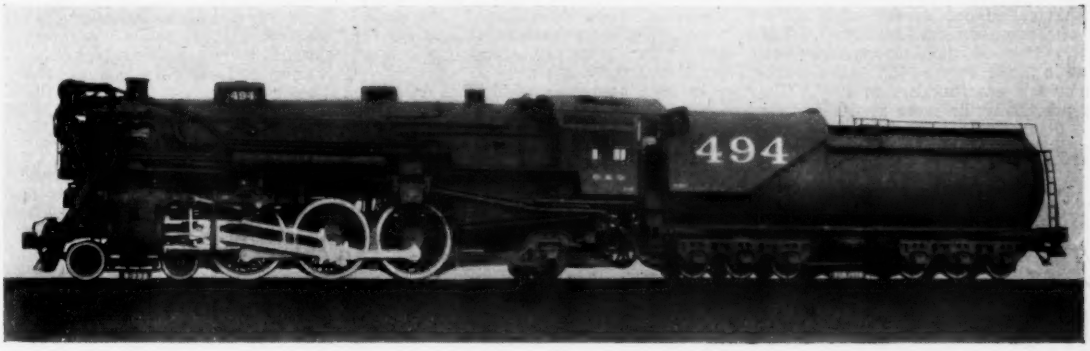
Simple-expansion Mallet 2-8-8-2 *locomotive built by the American Locomotive Company in* 1924



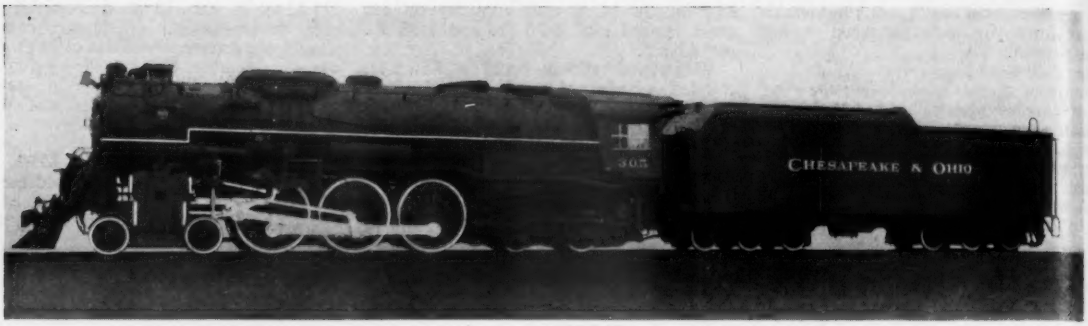
2-10-4 *freight locomotive built in* 1930 *at the Lima Locomotive Works*



4-8-4 *passenger locomotive built in* 1935 *at the Lima Locomotive Works*



Pacific type passenger locomotive built by the American Locomotive Company in 1926



4-6-4 passenger locomotive built in 1942 *at the Baldwin Locomotive Works*

Blue Ridge Mountains, the Lima Locomotive Works delivered, in 1935, some exceptionally large engines of the 4-8-4 type, the first of this design to be used by the C. & O. Known on the line as the "Greenbrier" type, these remarkable engines can develop a tractive force of 66,960 lb., main cylinders only, raised to 81,033 lb. by the Franklin booster driving the trailing wheels of the hind truck. This high tractive force is obtained by the use of 27½ in. by 30 in. cylinders, 6 ft. driving wheels, and a steam pressure of 250 lb. per sq. in.

On account of the considerable piston thrust resulting from these dimensions, articulated connecting and coupling rods are applied, which, as the second pair of wheels are the main drivers, reduces the main crank-pin loading by 50 per cent. It may be mentioned that the same form of rod assembly is used for the 2-10-4 freight engines.

The passenger engines have 14 in. valves and Walschaerts gear giving a 7½ in. full-gear valve travel. The firebox is very large, providing 525 sq. ft. of heating surface, including two syphons. The grate area is 100 sq. ft., and six combustion tubes are fitted in each side of the firebox, having an outside dia. of 2 in.; the total heating surfaces amount to 7,880 sq. ft. Five of these locomotives were placed in traffic during 1935, and a further two, by the same builders, in 1942. They were practically the same as the first five, differing principally by having the Baker valve gear and roller bearings for the front truck.

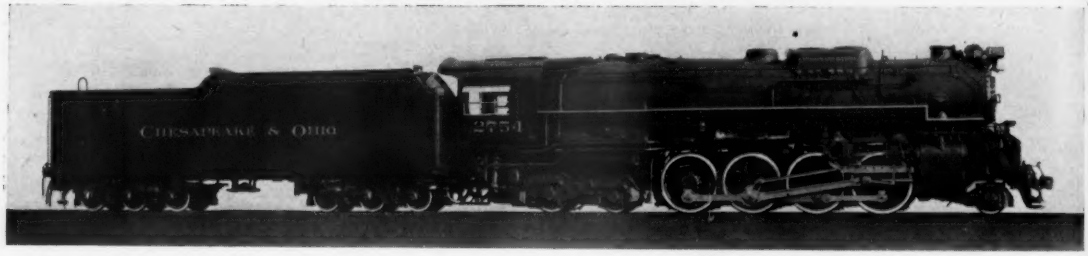
The three different types so far noticed, have the usual form of built-up cast-steel bar-frames and, with one exception, conventional journal boxes. All were equipped with feed-water heaters and, of course, mechanical stokers.

In addition to these 4-8-4 passenger engines, others for the same class of traffic include some Pacific locomotives, built by the American Locomotive Company early in 1926, illustrated by engine No. 494, and a further six-coupled design constructed by the Baldwin Locomotive Works, in 1942. These, of which eight were delivered, have the 4-6-4 wheel arrangement, as shown by engine No. 305.

Both designs have the normal type of bar framing and are equipped with feed-water heaters, the former having the Elesco closed type and the latter, the Worthington open pattern. The Baker valve gear is common to both. The Baldwin engines have two syphons in addition to arch tubes in the fireboxes and have boosters connected to the rear wheels of the hind four-wheel trucks. The 4-6-2 locomotives have Type "A" and the 4-6-4, Type "E" superheater equipment. The latter have roller bearings for the engine front and hind trucks and the tender truck axles.

In 1943 and early 1944, the American Locomotive Company built 40 2-8-4 engines for freight traffic—an interesting development in view of the locomotive tests of 1929 and 1930. These were followed by a further 30 in 1947, while, during 1945, 10 similar engines were supplied by Lima and a further 10 in 1947. All the 2-8-4 engines are alike, and are represented by the illustration of engine No. 2754, one of the 1947 series built by Lima. All have cast-steel bed-frames and roller bearings for all engine axles and a booster geared to the trailing axle of the hind truck.

Further equipment common to all the engines includes the Type "E" superheater, multi-valve throttles, underhung multiple bearing crossheads and guides, articulated driving-rods and feed-water heaters. The Baker valve gear is also standard.

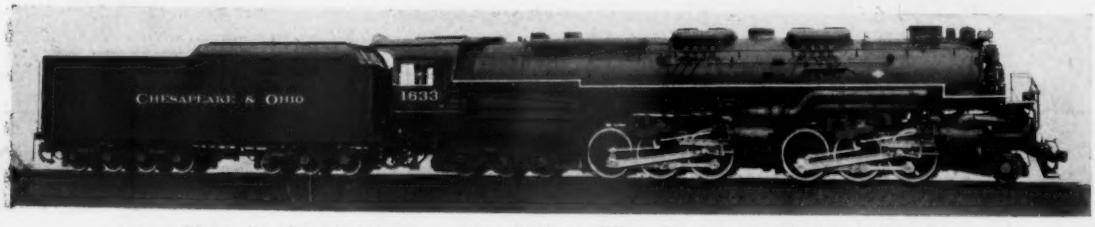


2-8-4 *freight locomotive built at the Lima Works*, 1945-7, *and by the American Locomotive Company*, 1943-7

A Further Mallet Design

To supplement the work done by the 2-8-8-2 Mallets and the 2-10-4 and 2-8-4 engines, a new Mallet design appeared in 1941, built by Lima. These large engines are notable for their high boiler capacity, the grate area being a noteworthy feature, which amounts to 135·2 sq. ft.

To support the large firebox, a trailing truck of entirely new design, having six wheels is used, while the power units are of the six-coupled type and at the leading end there is a single axle truck. The rated tractive force is 110,200 lb., comparing with 103,500 for the Mallets



Mallet 2-6-6-6 *freight locomotive, built at Lima Locomotive Works*, 1941-44

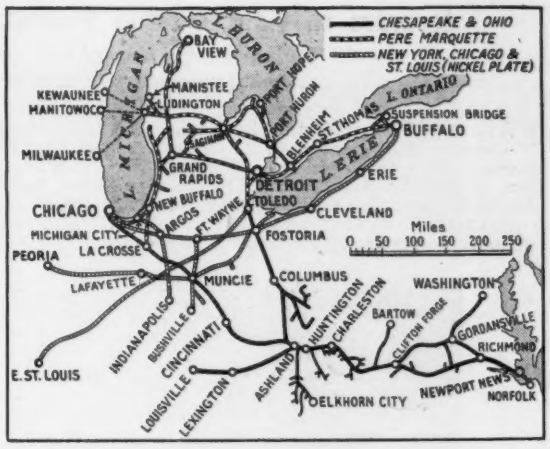
of 1924. These 2-6-6-6 Mallets have cast-steel bed-frames and roller-bearing journal boxes for the leading truck and the coupled axles. The 22½ in. by 33 in. cylinders have 12 in. valves, actuated by the Baker gear, and further equipment standard with the other locomotives includes Type "E" superheaters, multi-valve throttles, and underhung multiple bearing crossheads and guides.

These engines, 45 of which are in service, were built between 1941 and 1944, and are known as the "Allegheny" type. Although designed for maximum speeds of 60 m.p.h., the main objective of the design was the development of maximum powers at speeds of from 30 to 35 m.p.h. In view of the higher speeds contemplated, the driving wheels have a dia. of 5 ft. 7 in., comparing with 4 ft. 9 in. for the simple-expansion Mallets of 1924.

In continuance of the policy of providing modern motive-power, the railway company in 1946 and 1947, completely reconstructed at the Huntington Shops, Virginia, five Pacific passenger engines, originally built by the American Locomotive Company at Richmond, Virginia, during 1926. As now running, they are of the 4-6-4 type, a trailing four-wheel truck taking the place of the former two-wheel truck. The cylinders have been renewed and are fitted with poppet valves on the Franklin system; roller-bearing axle-boxes are used throughout and complete sets of new driving rods fitted with roller-bearing assemblies for all crank pins. Worthington feed-heating equipment and Franklin boosters driving the trailing wheels of the hind four-wheel trucks are also included. A streamlined casing is provided.

Recently the Lima Locomotive Works has delivered a further five passenger engines of the 4-8-4 type, generally similar to those supplied in 1935 and 1942. They are, however, modernised by having cast-steel bed-type framing and roller bearings throughout. In addition to these engines, the Baldwin Locomotive Works has in hand five 4-6-4 passenger engines, which will be fitted with poppet valves and gear on the Franklin system. Further new steam locomotives are to comprise fifteen more 2-6-6-6 Mallets of the "Allegheny" type, which have been ordered from Lima.

The steam locomotives mentioned in this article are of the conventional design, though embracing all modern improvements. They represent a continuous development, which has led up to the very large and revolutionary steam turbine-electric design, illustrated and described in *The Railway Gazette* of March 5 and April 30, 1948. In the preparation of this review of modern locomotive practice on the C. & O., the writer has received very considerable assistance from the Chesapeake & Ohio Railway, the American Locomotive Company, the Baldwin Locomotive Works, and the Lima Locomotive Works, Incorporated, division of the Lima-Hamilton Corporation.



Map showing the Chesapeake & Ohio Railway and adjacent lines

CHESAPEAKE & OHIO MODERN LOCOMOTIVES—PRINCIPAL DIMENSIONS

Type	2-8-8-2	4-6-2	2-10-4	4-8-4	2-6-6-6	4-6-4	2-8-4	4-6-4
Service	Freight	Passenger	Freight	Passenger	Freight	Passenger	Freight	Passenger
Date	1924	1926	1930	1935	1941-1944	1942	1943-1947	1946-1947
Cylinders, No., dia. × stroke	(4) 23 in.×32 in.	(2) 27 in.×28 in.	(2) 29 in.×34 in.	(2) 27½in.×30 in.	(4) 22½ in.×33 in.	(2) 25 in.×30 in.	(2) 26 in.×34 in.	(2) 27 in.×30 in.
Driving wheels, dia.	4 ft. 9 in.	6 ft. 1 in.	5 ft. 9 in.	6 ft.	5 ft. 7 in.	6 ft. 6 in.	5 ft. 9 in.	6 ft. 2 in.
Steam pressure, lb. per sq. in.	205	200	260	250	260	255	245	210
Tubes, No., dia.	278—2½ in.	212—2½ in.	59—2½ in.	65—2½ in.	48—2½ in.	50—2½ in.	73—2½ in.	41—2½ in.
Flues, No., dia.	60—5½ in.	48—5½ in.	275—3½ in.	220—3½ in.	278—3½ in.	198—3½ in.	202—3½ in.	195—3½ in.
Length	24 ft.	20 ft. 6 in.	21 ft.	21 ft.	23 ft.	18 ft.	19 ft.	20 ft. 6 in.
Heating surfaces								
Tubes and flues	5,976 sq. ft.	3,958 sq. ft.	5,990 sq. ft.	5,013 sq. ft.	6,478 sq. ft.	3,773 sq. ft.	4,308 sq. ft.	4,133 sq. ft.
Firebox	467 sq. ft.	381 sq. ft.	645 sq. ft.	525 sq. ft.	762 sq. ft.	460 sq. ft.	407 sq. ft.	281 sq. ft.
Evaporative total	6,443 sq. ft.	4,239 sq. ft.	6,635 sq. ft.	5,538 sq. ft.	7,240 sq. ft.	4,233 sq. ft.	4,715 sq. ft.	4,414 sq. ft.
Superheater	1,885 sq. ft.	1,213 sq. ft.	3,030 sq. ft.	2,342 sq. ft.	3,186 sq. ft.	1,810 sq. ft.	1,932 sq. ft.	2,001 sq. ft.
Combined	8,328 sq. ft.	5,452 sq. ft.	9,655 sq. ft.	7,880 sq. ft.	10,426 sq. ft.	6,043 sq. ft.	6,647 sq. ft.	6,415 sq. ft.
Grate area	112·9 sq. ft.	80·3 sq. ft.	121·7 sq. ft.	100 sq. ft.	135·2 sq. ft.	90 sq. ft.	90·3 sq. ft.	80·7 sq. ft.
Wheelbase								
Driving	42 ft.	13 ft.	24 ft. 4 in.	19 ft. 3 in.	34 ft. 8 in.	14 ft.	18 ft. 3 in.	13 ft.
Engine	58 ft. 1 in.	35 ft. 7 in.	49 ft. 3 in.	46 ft. 10½ in.	62 ft. 6 in.	41 ft. 5½ in.	42 ft.	37 ft. 11½ in.
Engine and tender	97 ft. 9½ in.	76 ft. 5½ in.	99 ft. 5½ in.	98 ft. 5½ in.	112 ft. 11 in.	91 ft. 8½ in.	93 ft. 2 in.	87 ft. 9½ in.
Weights								
On drivers	482,500 lb.	200,000 lb.	373,000 lb.	273,000 lb.	471,000 lb.	217,500 lb.	293,100 lb.	202,900 lb.
Engine	556,000 lb.	331,500 lb.	566,000 lb.	477,000 lb.	724,500 lb.	439,500 lb.	469,680 lb.	388,700 lb.
Tender	210,200 lb.	246,100 lb.	*330,670 lb.	381,700 lb.	*341,600 lb.	393,000 lb.	*315,770 lb.	355,300 lb.
Tender —								
Coal, tons (2,000 lb.)	15	15	30	25	25	30	30	28
Water, U.S. (gal.)	12,000	12,000	23,500	22,000	25,000	21,000	21,000	18,000
Type	8-wheel	12-wheel	12-wheel	12-wheel	14-wheel	12-wheel	12-wheel	12-wheel
Rated tractive force (cylinders)	103,500 lb.	47,500 lb.	91,584 lb.	66,960 lb.	110,200 lb.	52,000 lb.	69,350 lb.	49,200 lb.
Rated tractive force (booster incl.)	—	—	106,584 lb.	81,035 lb.	—	64,000 lb.	83,350 lb.	61,200 lb.
R.T.F. cyls./grate area	912	592	750	669·6	816	577	767	597
Factor of adhesion	4·66	4·22	4·07	4·08	4·27	4·17	4·23	4·13

* Tender weights two-thirds loaded

SOUTHERN REGION LECTURE & DEBATING SOCIETY VISITS.—On February 12, some nineteen members of British Railways, Southern Region, Lecture & Debating Society made a visit to the Kentish colliery at Tilmanstone. After changing into suitable clothing and being equipped with miners' lamps, the party was conducted over the whole underground working by the colliery deputy in charge of mining operations. A visit to the London Transport Central Line, western extension, took place on February 26, when the party assembled at Hanger Lane Station and was escorted over the first portion of the extension by Mr. W. Cowan, District Traffic Superintendent (Central Line), Oxford Circus, and Mr. G. Kenton, District Inspector, Western End (Central Line). At Greenford, the station buildings, ticket office, and layout were examined, Mr. Cowan also being assisted by Mr. F. Honeybone, Chief District Inspector, British Railways, Western Region, Paddington. At Ruislip Gardens, the station layout and signal-box were inspected, after which the party visited West Ruislip Depot, under the guidance of Mr. E. P. Lumley, Depot Engineer, assisted by Mr. F. West, General Depot Foreman, and Mr. J. Kidd, Technical Assistant. The proceedings ended with a short trip by a special two-car train to West Ruislip Station, where the 59-lever signal cabin was inspected.

SOUTHERN RAILWAY DRAMATIC SOCIETY.—Mr. Ivor Novello's comedy "Full House" is to be presented at the Scala Theatre, London, on Friday, April 22, at 6.45 p.m., by the Southern Railway Dramatic Society.

Repairs to East Norton Viaduct, L.M.R.

Defective arch strengthened by new piers on concrete foundations

EAST NORTON viaduct, a brick-built structure of 13 spans of 40 ft., on the Market Harborough-Melton Mowbray line of the London Midland Region, British Railways, is undergoing extensive repairs because two of the 60-ft. high piers are moving on their clay foundations. The piers were out of plumb by 3 in. and 1¼ in. respectively, and the arch had sagged on one side, and lifted on the other. This movement had caused a hump on the parapet and a "ripple" in the courses of brickwork.

To relieve the pressure on the defective brickwork, timber centerings, supported by steel needles built into the piers, were fixed beneath the arch. Ballast and filling from the permanent way were then removed, and temporary girders were provided to support the track. With the arch made safe, the work of strengthening was put in hand. Reinforced-concrete pressure piles were placed between the two faulty piers, and a concrete mat laid over them. Similar piles, covered with a concrete mat, were laid under an adjoining arch, but extended only half way between the piers, so that a cushion of earth separated them from the next pier. To ensure that the foundations of the piers were not disturbed, great care had to be taken in placing the concrete mats, and they were laid in 3-ft. widths, with a 7-day interval between the laying of each width.

Two new auxiliary piers, now under construction, will support an additional arch, which will be erected beneath the existing defective span. When the new arch is complete, hand-packed dry rubble will be placed between the new and the old arches, and this will be grouted in cement. The work, which should be completed within the next 12 months, is being carried out by Wellerman Bros., Sheffield. The reinforced concrete piling for the work was undertaken by the Pressure Piling (Parent) Co. Ltd., Grosvenor Gardens, London, S.W.1.

Timber centering supporting the defective arch during construction of the new auxiliary piers. The "ripple" in the brickwork caused by the movement of the piers will be noted

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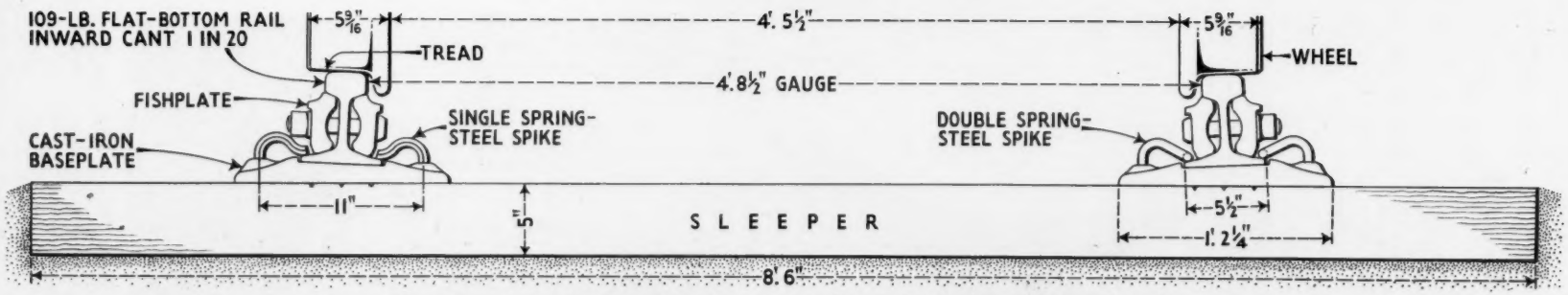
THE LOCOMOTIVE INDUSTRY IN THE BIZONE OF GERMANY.—Since 1945, the four locomotive building concerns in the British and American zones of occupation—Henschel & Sohn, of Cassel, and Fried. Krupp Lokomotivfabrik, of Essen, in the British zone, and Krauss-Maffei A.G., of Munich-Allach, and Maschinenfabrik Esslingen A.G., of Esslingen-Neckar, in the American zone—have been required by the occupation authorities, the Reichsbahn, and the various economic ministries concerned to concentrate their activities on repair work to the exclusion of all building of new locomotives. The scheme known as the B-Plan, which succeeded the A-Plan, envisaged a substantial increase of the repair potential of the four works concerned which was to have reached its climax by 1951. Measures taken in this connection were halted when the Reichsbahn announced in the autumn of 1948 its intention not to participate in the B-Plan. The outcome of the ensuing negotiations was the reduction to 550 of the 1,300 overhauls or large-scale repairs laid down for 1949; a further 700 locomotives are to be repaired in 1950. This revised programme, confirmed by the end of 1948, was repealed on January 20, when the Reichsbahn announced its inability to keep to the agreement, and its intention to place no further orders for locomotive repairs. A warning issued by the locomotive industry points out that the industry would be facing ruin should that intention materialise. Six thousand workers would have to be dismissed forthwith, and other dismissals would follow. The 6,000 represent more than 60 per cent. of the labour at present employed by the four undertakings. The industry stressed the fact that the stoppage would deprive German economy of an important source of foreign currency, and it transpired that negotiations already had been in progress for securing substantial export orders. To avert the worst, the four works made joint representations at Frankfurt with a view to bringing pressure to bear on the Reichsbahn to induce it to free a monthly minimum of 4,000,000 marks to enable further locomotive repair orders to be undertaken.

British Flat-Bottom Track

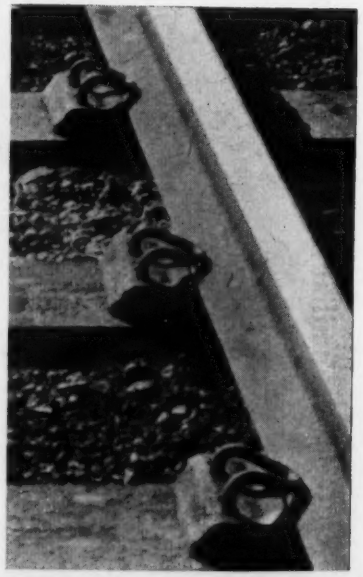


Typical cross-section of standard track with proposed 109-lb. rail, showing alternative types of fastening

60-lb. F.B. rail of British Standards section, with clip-and-bolt fastening, on the Liverpool Overhead Railway, which has always used F.B. rail

110-lb. F.B. rail of British Standards section, with bolt-and-clip fastening, Eastern Region, British Railways; elastic spike fastening on track in background

113-lb. F.B. rail of section designed by committee of British railway companies, with elastic spike fastening, Western Region, British Railways



113-lb. F.B. rail, London Midland Region, British Railways, with double spring-steel fastening. Both forms of spring-steel fastening will be used with standard 109-lb. rail

A Familiar Lineside Scene in Switzerland

One of the 947 women level-crossing keepers employed by the Swiss Federal Railways

[Photo] ["The Swiss Federal Railways Today"]

RAILWAY NEWS SECTION

PERSONAL

Mr. J. B. Stephens has been elected Chairman of the Irish Railway Clearing House Committee for 1949, in place of Mr. A. P. Reynolds, who has resigned.

Richard Thomas & Baldwins Limited announces that Sir W. Charles Wright, now in his 74th year, has decided to resign as a Director of the company on March 31.

Mr. W. H. F. Mepsted, who, as recorded in our March 4 issue, has been appointed Commercial Superintendent, Southern Region, British Railways, was born at Gillingham, Kent, and entered the Goods Department of the South Eastern & Chatham Railway at Deal in 1912. After gaining general experience at stations he joined the staff of the Eastern District Superintendent at Ashford in 1914. During the 1914-18 war he served in France and Belgium with the Railway Operating Division, R.E., returning to the railway in 1919. He undertook various special duties, including control of the hop-picking traffic arrangements in the Paddock Wood area and the seasonal passenger traffic in the Kent Coast area. In January, 1924, Mr. Mepsted joined the staff of the newly-appointed Southern Divisional Operating Superintendent at Brighton as Passenger Trains Clerk, where he played a prominent part in the re-construction of the Central Section passenger train timetable. In April, 1925, he was appointed Assistant Stationmaster at Victoria, and he became Senior Assistant Stationmaster there in 1928. In 1933 he was appointed Stationmaster at Charing Cross, and, in 1936, Assistant London East Divisional Superintendent. In 1941 he became Southern Divisional Superintendent, Southampton, and three years later was appointed Assistant Commercial Superintendent of the Southern Railway. During his term of office at Southampton as Southern Divisional Superintendent, Mr. Mepsted was a member of the Poole Harbour Commission and the Southampton Port Emergency Committee. Until the railways were nationalised he was a member of the R.C.H. Goods Managers' Conference and Coaching Traffic Superintendents' Conference, in addition to being a member of the Road-Rail Negotiating Committee of the Road & Rail Central Conference.

Mr. W. H. F. Mepsted

Appointed Commercial Superintendent, Southern Region, British Railways

Mr. P. H. Patterson has been appointed Accountant of the Great Northern Railway (Ireland), in succession to Mr. J. G. Shanahan, who retires on March 31. Mr. H. J. Fox will become Deputy Accountant.

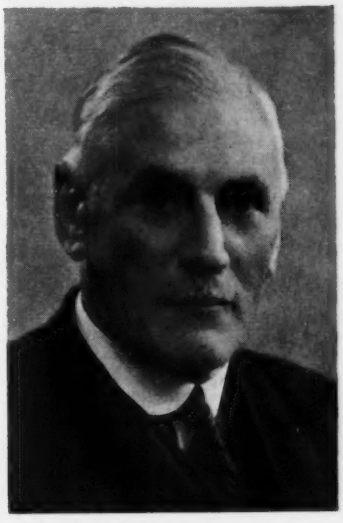
Mr. A. E. Hammett, Commercial Superintendent, Southern Region, British Railways, who, as recorded in our March 4 issue, has been appointed Commercial Superintendent, London Midland Region, entered the service of the L.S.W.R. in 1905 in that company's City offices, where he gained experience in all branches of goods, parcels and passenger train traffic and London cartage working. In 1913 he was transferred to the Claims Office of the London Goods Superintendent, and during 1914-15 was entrusted with the duty of re-organising L.S.W.R. crane tackle and rope stock to meet the demand of war traffic. In 1916 he was Personal Clerk to the London Goods Superintendent, and in 1917 was made District Representative for Goods Station Working. Two years later Mr. Hammett was appointed Outdoor General Assistant to the Goods Manager, and in 1921 was selected for the position of Chief Cartage Assistant. On the amalgamation in 1923 he was engaged on special duties in connection with the co-ordination of cartage operations and development of traffic. In 1930 he was appointed Deputy Assistant for Road Transport, Southern Railway, and in the next year became Assistant for Road Transport. In 1934 he was promoted Rates & Fares Assistant to the Traffic Manager. He was made Assistant Commercial Superintendent in 1937, and Commercial Superintendent in January, 1944. Mr. Hammett is a past Member of Council of the Institute of Transport. He was a member of the Road & Rail Central Conference, and Chairman of the Railway Executive Passenger Committee, 1944, Coaching Traffic Superintendents' Conference, 1945, and Railway Executive Goods Committee and Goods Managers' Conference, 1946 and 1947. He is a Freeman of the City of London.

Mr. A. E. Hammett

Appointed Commercial Superintendent, London Midland Region, British Railways

Wing-Commander N. J. Hulbert, M.P., has been appointed a Director of the Metropolitan-Vickers Electrical Export Co. Ltd.

We regret to record the death, at Monte Carlo, on February 25, at the age of 76, of Mr. Frederick Austin Brant, O.B.E., who was Assistant to the Traffic Manager for Continental Traffic, Southern Railway, from 1923 to 1934. Mr. Brant joined the London Chatham & Dover Railway in 1889. After serving in various capacities, including a period on the staff of the Superintendent of the Line, he entered the Continental Traffic Manager's Office in 1897, in which he was subsequently appointed Chief Clerk. In 1914 he became Inspector of Continental agencies, with headquarters at Boulogne. From the outbreak of war until the end of 1915 he was in charge of South Eastern & Chatham Railway interests at Boulogne, and rendered liaison services between the railway and the Admiralty and War Office for the transport arrangements of the B.E.F. At the end of 1915 he was transferred to London, and, on account of his knowledge of languages and of Continental railway practice, he undertook special missions for the War Office Intelligence Department to various parts of the Continent. He also organised overland transport of coal for the Italian State Railways from Bordeaux at the time of the submarine menace in the Mediterranean. In 1920 Mr. Brant was appointed Continental Traffic Assistant to the General Manager, S.E.C.R. On the formation of the Southern Railway in 1923 he was appointed Assistant to Traffic Manager for Continental Traffic, from which position he retired in 1934. He held a number of foreign decorations, including the Legion of Honour.



The late Mr. F. A. Brant

Assistant to Traffic Manager for Continental Traffic, Southern Railway, 1923-34

Mr. E. C. Cookson

Appointed Assistant Engineer (Permanent Way), Western Region, British Railways

Mr. S. T. Clayton

Appointed Assistant Motive Power Superintendent, L.M. Region, British Railways

Mr. S. H. Scholes

Appointed Assistant Chief Officer for Labour & Establishment, L.M. Region, British Railways

Mr. E. C. Cookson, B.Sc.(Eng.), A.C.G.I., M.I.C.E., M.Inst.T., Divisional Engineer, Newport, Western Region, British Railways, who, as recorded in our February 25 issue, has been appointed Assistant Engineer (Permanent Way) for the Region, was educated at St. Paul's School, and afterwards at the City & Guilds Engineering College, where he graduated as an Associate of the City & Guilds of London Institute and B.Sc.(Eng.). In 1927-28 he was awarded a Miller Prize by the Institution of Civil Engineers for a paper on the reconstruction at Paddington Goods Station. Mr. Cookson entered the service of the Great Western Railway in 1923 in the New Works Department, Chief Engineer's Office. Later he became Assistant Resident Engineer on constructional works at Newport goods and passenger stations, Cardiff Queen Street and Bute Road Stations, Swansea High Street Station, Briton Ferry hump yard and other points. In 1925 he joined the staff of the Divisional Engineer at Gloucester, and in 1926 returned to the New Works Department at Paddington. In 1929 he was appointed Assistant to the Divisional Engineer, Shrewsbury, and under him was responsible for the Morpeth Goods Depot alterations at Birkenhead. In 1933 he became Assistant Divisional Engineer, Plymouth, and, in 1935, Assistant Divisional Engineer, London. He was made Divisional Engineer, Newport, in February, 1940, but did not take up that post, as he was on active service. On the formation of the Transportation units of the Royal Engineers Supplementary Reserve, in 1925, Mr. Cookson had been given a commission in a railway construction company, Royal Engineers. He was mobilised on September 1, 1939, in command of a railway construction company, and subsequently commanded a railway construction and maintenance group, with the rank of Lt.-Colonel. He was mentioned in despatches, and, on return from service overseas with the B.E.F., was released from the Army for special duties in the Chief Engineer's Office, G.W.R., in which he was made Assistant to the Chief Engineer in October, 1941. He was again appointed Divisional Engineer, Newport, as from January 1, 1945. Mr. Cookson is a member of the Royal Institution of Great Britain and of the Société des Ingénieurs Civils de France.

Mr. S. T. Clayton, District Motive Power Superintendent, Glasgow (North), Scottish Region, British Railways, who, as recorded in our February 25 issue, has been appointed Assistant Motive Power Superintendent, London Midland Region, entered the service of the Lancashire & Yorkshire Railway as an apprentice at Horwich Works in 1909. He served with the 51st Highland Division in France from November, 1914, to April, 1916, when he was discharged after being wounded. He returned to the L.Y.R. in 1916 at Wakefield, and subsequently served at Low Moor (Bradford), Sowerby Bridge and Lower Darwen Motive Power Depots. In 1928 Mr. Clayton was appointed Assistant District Locomotive Superintendent, Carlisle, L.M.S.R. He became Chairman of the Locomotive Analysis Committee, Midland Division, in 1934; Utilisation Assistant, Divisional Superintendent's Office, Manchester, in 1935; and Maintenance Assistant, Divisional Superintendent's Office, Derby, in 1937; and in the next year was appointed District Locomotive Superintendent, Bank Hall (Liverpool). He became District Locomotive Superintendent, Rugby, in 1940, and from then until 1943, when he was appointed District Locomotive Superintendent, Polmadie, took an active part in the Home Guard organisation with the rank of Major in the 7th Battalion, Royal Warwickshire Regiment. In 1945 he was made General Assistant (Motive Power) to the Operating Manager, Northern Division, Glasgow, and on January 1, 1949, became District Motive Power Superintendent, Glasgow (North), Scottish Region. Mr. Clayton was a member of the Scottish Fuel Efficiency Committee, on which he represented the Railway Executive (Scottish Region).

Mr. S. H. Scholes, who, as recorded in our February 25 issue, has been appointed Assistant Chief Officer for Labour & Establishment, London Midland Region, British Railways, joined the L.N.W.R. at Liverpool in 1905. After station experience he was transferred to the Staff Office of the District Superintendent there, and a few years later to the Headquarters Staff Office of the Superintendent of the Line. He served during the 1914-18 war with the Royal Engineers (Transportation). After the amalgamation he was appointed to the Staff Office of the General Superintendent (Western Division), L.M.S.R. Mr. Scholes was made Assistant to the Staff Superintendent of the combined Chief Commercial and Chief Operating Managers' Departments in 1932. Between the war years he served on the Headquarters Closer Working and Pooling Committees and on the H.Q. Job Analysis Committee. In 1943 he became Assistant (General), Labour & Establishment Office, Euston.

We regret to record the death on March 7, at the age of 73, of Sir Archibald Page, who was General Manager from 1927-35, and Chairman from 1935-44, of the Central Electricity Board.

Colonel Sanches da Gama, Director of Colonial Development for the Portuguese Government, recently visited the Manchester works of Beyer, Peacock & Co. Ltd. to inspect locomotives now being completed by that company for the Luanda Railway.

The following promotions have been gazetted under the heading of Territorial Army—Corps of Royal Engineers: Engineer & Railway Staff Corps:—Lt.-Colonels to be Colonels: D. M. Watson, J. C. L. Train, V. M. Barrington-Ward; Majors to be Lt.-Colonels: S. E. Parkhouse, H. Rudgard, W. H. S. Tripp, R. M. T. Richards, J. Briggs, W. E. Blizard, C. E. Boast, A. Dean.

Western Region Appointments

The following appointments are announced in the Western Region, British Railways:—

Mr. H. H. Starr, District Goods Manager, London, to be General Assistant to Commercial Superintendent. A portrait and biography of Mr. Starr appeared in our February 20, 1948, issue.

Mr. H. E. B. Cavanagh, Assistant to the Architect, Civil Engineer's Department, Paddington, to be Architect.

Gas Turbine Locomotives*

Progress in the design of railway gas turbines for Great Britain, Switzerland, and the United States

The first gas turbine locomotive, a Brown-Boveri 2,200-h.p. machine, was inspected by Mr. Hawksworth, Chief Mechanical Engineer, British Railways, Western Region, and the author, at Basle, in 1946. It was ordered in 1939 by the Swiss Federal Railways from Brown-Boveri of Baden, which was responsible for the design and construction, with the exception of the frames, bogies, running gear, and so forth, which were supplied by the Swiss Locomotive Company of Winterthur.

The power unit is suspended by three-point elastic suspension from the frame of the locomotive. The compressor raises the pressure of the air to about 40 lb. per sq. in., and it then passes through the heat exchanger to the combustion chamber, where it is raised in temperature by the combustion of the fuel, to about 850-1,100° F., the greater proportion of the air being admitted as secondary air and reducing the gas temperature to the figure quoted. In the turbine, about 8,000 h.p. is developed, of which 6,000 h.p. is absorbed by the compressors. The balance, actually 2,200 h.p., drives a d.c. generator, through a ten-to-one reduction gearing.

The set is started by a 100-h.p. diesel engine, which drives an auxiliary generator of 75 kW. capacity. This auxiliary generator supplies current to "motor" the main generator up to a speed sufficient for the compressor to deliver to the combustion chamber, air at the pressure required for ignition. The combustion is started first on diesel oil, which is ignited by an electrically-heated ceramic stick, similar to a domestic fire element. The turbine then accelerates under its own power from 1,300 r.p.m. to about 3,500 r.p.m., when the diesel oil is shut off and crude fuel-oil injected. Starting from cold takes about four min. The driver's control is a simple horizontal wheel with eleven different working positions. Each of these positions corresponds to a power rate output from the set: the fuel injection to the turbine, which governs the horsepower and hence the electrical energy generated, being automatically adjusted by a series of oil-operated relays.

The locomotive was built for the Swiss Federal Railways for use on certain branch lines on which electrification had not then been completed. It had first been put in service late in 1941. Electrification of the branch lines on which the locomotive was first operated was completed in 1944 and the engine then was loaned to the French National Railways to operate passenger trains between Basle and Chaumont. On these services, trains up to 700 tons weight were being handled and a round trip of 300 miles daily regularly was being achieved. The maximum speed of the locomotive was 70 m.p.h., with a fuel consumption of about 25 lb. per mile (0·5 to 0·6 lb. per ton-mile), which corresponds to a figure of 0·8797 lb. per s.h.p.h.

When the engine was inspected in June, 1946, particular note was taken of the operation of starting the turbine. At the commencement, while the diesel engine was rotating the set the only phenomenon which could be detected was a fairly high pitched whining noise, which rose in pitch as the rotational speed of the turbine increased. When idling at full rotational speed, the whining noise practically ceased and only a sound like rustling wind was heard. A short trip between Basle and Mulhouse revealed that no increase in the turbine noise was apparent, neither were there any smell, or fumes. The exhaust from the louvres in the roof was perfectly clear.

It was not possible to make any very conclusive records of the engine's performance. The maximum speed reached was about 55-60 m.p.h., and the machine rode well at that speed. Response to the driver's manipulation of the main control wheel was instant and satisfactory. Throughout the trip, the locomotive behaved in a very satisfactory manner and there was nothing to indicate that the engine was a novel and previously untried design. It became clear that in their initial design for a gas turbine locomotive, Brown-Boveri had advanced the technique to a point where the experimental stage had been left behind and the various components had been matched together in correct proportion to each other, so that the outcome was a unified design and not merely an aggregation of individual items assembled on a movable undercarriage.

American Projects

In America, the advent of the oil-burning gas turbine, with its freedom from maintenance complications, as compared with the diesel, has caused additional interest in all types of oil-fuelled locomotives. So much so, in fact, that railways serving coal bearing areas, as well as the collieries, both parties being vitally affected by the drift away from coal as the fuel for railway use, have felt it necessary to appoint a locomotive development committee to investigate the possibility of firing a gas turbine locomotive with coal. This committee functions in conjunction with the American locomotive builders and equipment manufacturers, as well as with the research organisations of the universities and technical colleges.

An ambitious programme embraced within the terms of reference resulted in a decision to build two gas turbine locomotives fired by coal and have them on test by June, 1948. The two major problems were defined as: Development of coal handling, crushing, feeding and burning, as well as the ash-removal features involved; specification of main design and performance data for locomotive-type gas turbine.

As a result of the committee's preliminary work, it was able to state in April, 1946, that two gas turbine locomotives burning coal were being projected for building, one by the American Locomotive Company, using an Allis Chalmers gas turbine of 4,200 h.p., and the other by Baldwin, using an Elliott gas turbine of 3,750 h.p.

The coal was to be handled from the bunker by an Archimedean screw conveyor, which carried it to a breaker where it was to be reduced in size to below 2 in. Thence it was delivered to a hammer anvil, where it was brought down to below 16 mesh. Power requirements up to this stage were 10 h.p. per 4,000 lb. of coal per hr. The coal was to be blown by compressed air, through a nozzle, in which the pressure was reduced from 140 to 65 lb. per sq. in. One description of the method of operation of this atomiser is that it works by "explosion" of occluded air in the coal. Whatever may be the correct explanation, the coal was expected to be reduced to 3 per cent. residue only on 100 I.M.M. sieve. Finally, the coal was passed through a conical cycloniser where the heavier particles were to be separated out and the finest fractions passed to the combustion chamber. The final result was expected to be coal of average particle size of one-quarter the aperture on a 325 I.M.M. sieve.

On the question of combustion, sufficient has not yet been published to define clearly how the pulverised fuel was to be burnt, but a conventional-type burner appears to be likely.

The main problem of cleansing the hot gases and the removal of the abrasive particles was being attempted by what is known as an Aerotec filter, based on the principle of cyclonic spiral flow. Experiments were undertaken to explore the possibility of using the fly ash so extracted to sand the track.

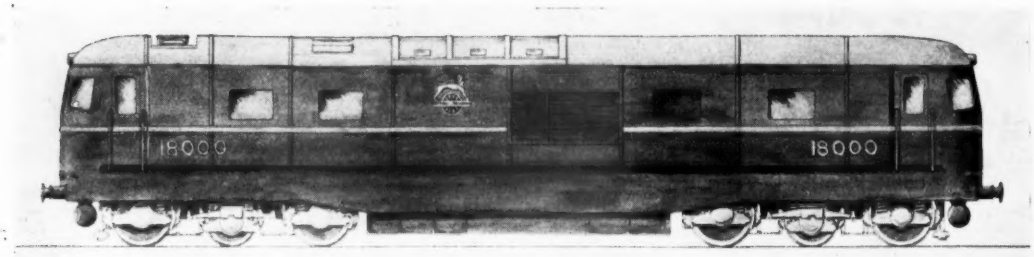
Since the foregoing details of the proposals were released about two years ago, some information about the progress of the designs has been forthcoming. It is understood that the original proposals for pulverising the coal did not fulfil their early promise, and, in consequence, fairly large particles of partly burned fuel were deposited in the Aerotec filter, which consequently burned out. This method of pulverising has been abandoned. Further, only one locomotive now is to be constructed.

The coal-burning gas turbine locomotive is not yet a practical proposition, but there can be little doubt that eventually it will come. When it does, the experience which will have already been gained on British Railways with oil-burning gas turbines will ensure full support for a machine burning indigenous fuel.

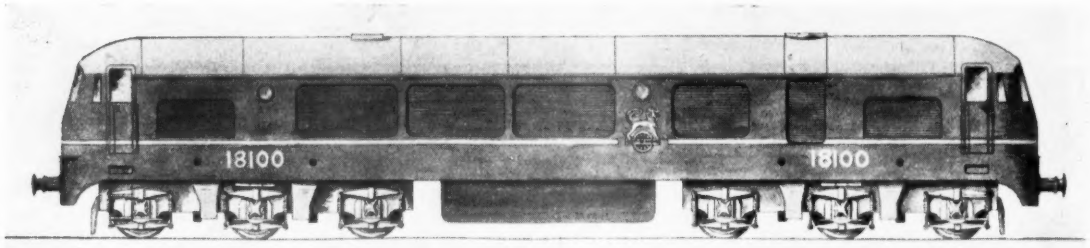
Some particulars recently have been released of an oil-burning gas turbine locomotive built in America. This locomotive, which has a 4,800 s.h.p. rating, is now undergoing service tests, after the power unit has been subjected to lengthy trial runs in the workshops. Its power unit consists of a multi-stage axial compressor, with a number of combustion chambers arranged around the main shaft. The drive to the road wheels is through an electrical generator driven by the turbine feeding traction motors in the bogies. The locomotive is carried on two four-axle articulated bogies, and weighs approximately 223 tons. Its probable maximum speed is 79 m.p.h. and it carries enough fuel for 12 hours operation at full load. It is expected to exert a continuous tractive effort of 68,400 lb. at 20·4 m.p.h. The locomotive apparently is designed to burn the heaviest grade of crude oil, but has been operating on diesel oil. Its overall thermal efficiency is quoted as 18·5 per cent.

Apart from obvious differences between the Brown-Boveri and Metropolitan-Vickers engines now under construction for Western Region, British Railways, such as power, weight, and number of driven axles, each of which has had important influences in final detailed design, some interesting comparisons between the machines arise from examination of their power units. The gas turbine emerged from the work of Sir Frank Whittle on the jet engine on the one hand, and from the work of engineers concerned with stationary plant, such as blast furnaces, on the other hand. Examination of the Brown-Boveri design reveals that its

* Abstract of a paper: "Gas Jets and Gas Turbines for Railway Traction," read before British Railways, Western Region, London Lecture & Debating Society, on February 17, by Mr. A. W. J. Dymond, Assistant to Chief Mechanical Engineer, Western Region.



Artists' impression of the Brown-Boveri gas-turbine locomotive under construction for British Railways. Western Region



Artists' impression of gas-turbine locomotive designed for the Western Region by Metropolitan-Vickers

ancestry is the stationary plant developments, the single combustion chamber, heat exchanger, and other details in its design and construction having much in common with power station and marine plants, in the design of which the firm has been actively engaged for some time past. By comparison, the Metropolitan-Vickers design shows clearly its antecedents in the aircraft jet engine; the six combustion chambers arranged circumferentially around the main shaft being particularly characteristic of the aircraft design.

The absence of a heat exchanger also follows aircraft practice. Such an auxiliary, however, could have been incorporated in the design, although this would have involved some fundamental alterations to the layout. Differences between the two units also exist in the working temperatures and pressures and in the fuel to be consumed, and a detailed study of the performances of the two locomotives will be of great technical interest.

The prospect of using gas turbines to drive railway locomotives is conditioned by two main considerations: Higher overall efficiency of the turbine (say 16-18 per cent.), compared with the steam reciprocating engine (say 7-9 per cent.); better overall efficiency of the diesel engine (say 27 per cent.) compared with the turbine.

The steam engine, even in its most developed form, costs substantially less than either the diesel or the turbine, though both diesel and turbine afford much greater opportunity for high overall availability, due to the absence of necessity to clean fires and ashpans between trips, and, at short intervals, to wash out the boiler. Coupled with the ever increasing difficulty of recruiting suitable labour to carry out these arduous duties, their elimination makes a massive contribution to the solution of the operating problems of the railway. The steam locomotive, therefore, despite its cheaper first cost, seems to be approaching its demise because of low efficiency and relatively poor overall availability.

The diesel, at present, has the advantage of proved success: its performance and the length of its life can be gauged with confidence. Overall efficiency is more than can be achieved with certainty by the turbine. Its big drawback, however, is the expensive maintenance it entails, requiring the provision of special staff and facilities and the establishment of elaborate periodical examination procedure for its multitudinous parts. Its first cost, also, especially in the higher horsepowers, appears to be distinctly greater than the corresponding turbine, as does also the tare and length of the vehicle in which it is housed. This being so, the possibility of using a gas turbine for locomotive purposes must rest on its justifiable claim to require substantially less in maintenance, and to be lighter and smaller than the diesel.

The net outcome of these considerations is the tentative view that the gas turbine, despite its greater first cost, may supplant the steam locomotive, especially for higher duties, on account of its greater thermal efficiency and overall availability, and may prove a formidable rival to the diesel, despite a slightly less thermal efficiency, as it is lighter, smaller, cheaper, and requires the barest maintenance provision.

SIR CYRIL HURCOMB ON SHIPPING.—Speaking at the jubilee dinner of the North East Coast Ship Repairers' Association, held at Newcastle on March 3, Sir Cyril Hurcomb, Chairman of the British Transport Commission, said that his connection with shipping during two world wars had given him a lasting interest in our maritime fortunes and the industries associated with them. He would like to congratulate the shipowners and repairers on the North East Coast on the work they had done to further the task of reconditioning liner tonnage converted under the necessities of war to purposes little dreamed of by the ship designers. Perhaps he had a more direct claim to respond to the toast of the "Maritime Industries" as a shipowner. At the present time the B.T.C. was the registered owner of about 70 ships. Its policy was to restore and maintain those specialised services which our railway companies in conjunction with Continental railway administrations had developed so successfully in the past. The importance of the cross-Channel steamers in promoting cultural and business relations with the Continent was great. Their train ferries, which had been built on the Tyne, also had proved popular. What the B.T.C. had to do was to discharge its statutory duties and fulfil a strictly defined rôle in the great network of British shipping services. Yet they would not be competitive with shipping in general even on the short sea routes. Another sphere in which the Commission had an interest in shipping was as a partner with the Coast Lines in the provision of services on the West Coast of Scotland and its islands. They wanted them served as well as circumstances would permit. It was difficult to replace ships, many of which were very old, unless it could be done at a price which left reasonable prospect of a return.

THOS. COOK & SON LTD. OPERA SECTION.—The operatic section of Thos. Cook & Son Ltd. celebrated its silver jubilee with a presentation of Gilbert & Sullivan's "The Mikado," to full houses at King George's Hall, W.C.1, on March 3, 4, and 5.

PAPER PILLOWS FOR RAIL PASSENGERS.—Experiments are to be carried out on British Railways in the use of hygienic paper pillows for passengers travelling by night trains. These pillows are about 15 in. square and are filled with shredded paper to give the necessary bulk and springiness. The outer cover is of a highly bleached cellulosed paper and the whole pillow is enclosed in a sealed cellophane wrapper. They will be available to passengers travelling on the night trains from Kings Cross commencing on March 14 and will be on sale at 1s. each on the platforms.

Education and Transport*

Mr. F. J. Wymer suggests a new approach to the problems of technical education

The Oxford Dictionary defines education as the bringing up of the young, systematic instruction, and the development of character or mental powers. In the first phases in early life we have to learn how to learn—to condition our minds to interpret the vast number of mental stimuli they will receive in the future. At a later stage there is specialised education to adapt our minds to a career. The age at which specialisation should start and its extent is debatable.

At the moment, when the vastness of the field of learning is becoming apparent to the young, a process of selection and specialisation has to commence. It is unfortunate that so many have to choose the way when their minds have hardly developed to the extent of knowing for certainty the direction of the choice.

It is comparatively easy to provide people in later life with a sufficiency of technical knowledge to do a job of work. In war, people have been trained in a very short while to do jobs which they had never contemplated, and to do them successfully. Equally, however, there is no doubt that real satisfaction is obtained only when the technical knowledge is but the pinnacle to a generally sound structure.

Most boys likely to enter the transport industry would be found amongst those taking at school modern languages and science. My father was a mechanical engineer of somewhat taciturn disposition, but he was fluent on boilers, engines, and turbines. He often took me to paper mills, cement works, breweries, power stations, and so on; I acquired a considerable, if rudimentary, insight to engineering.

The critical point in the making of decisions as to careers was at school leaving. Until 1914, and between 1918 and 1938, this critical point in the career of every boy could be determined accurately. It was then that the boy set out on his career, whether or not that involved a further period of higher education. During the two wars matters were not so simple. I would say to those men about to undergo—or undergoing—military service that you will gain by it if you make the best use of it. You will gain knowledge. You will gain self-respect, and pride in achievement. Above all, you will gain in the knowledge of men, in the ability to live, work, and fight, with men, for men.

At the point reached by any young man, either on leaving school or after military service, who has decided to make his career in transport, what do those directly concerned with higher education put before him in the way of education and training?

If he has decided to enter transport through the gate labelled engineering—civil, mechanical, or electrical—what he has to study is well defined. For those who choose to serve transport in a professional technical capacity also the road of progress is well sign-posted.

What of those who, in the main, become students, graduates, associates, and members of the Institute of Transport, and who are responsible for the operation and administration of our transport undertakings. The way for them is not so clearly delineated. The syllabus of the graduateship examination shows that the students will be examined in general economics, the elements of statistics, the elements of transport, economic geography or modern economic history, the law of inland, sea, or air transport, and English.

I think many young men newly entered into the transport industry when confronted with the Institute's syllabus or the prospectuses issued by universities and training centres must have difficulty in seeing any direct connection between their work and the subjects they are called on to study.

I suggest that the reason for this is to be found in a failure to recognise that more and more in every field of transport modern equipment and technique is leading inevitably to specialisation under two heads—the operation of transport and the sale of transport. I think a young man on the commercial side of a large branch of the transport industry might well see the direct value to him of economics, law, and statistics. Does that apply equally to a young man concerned with operation? That young man may feel that he wants to study cargo handling—quayside equipment, mechanisation, storage, and so forth—and, depending on the variety of his former education and interests, he may well feel that he wants some insight into basic principles involved.

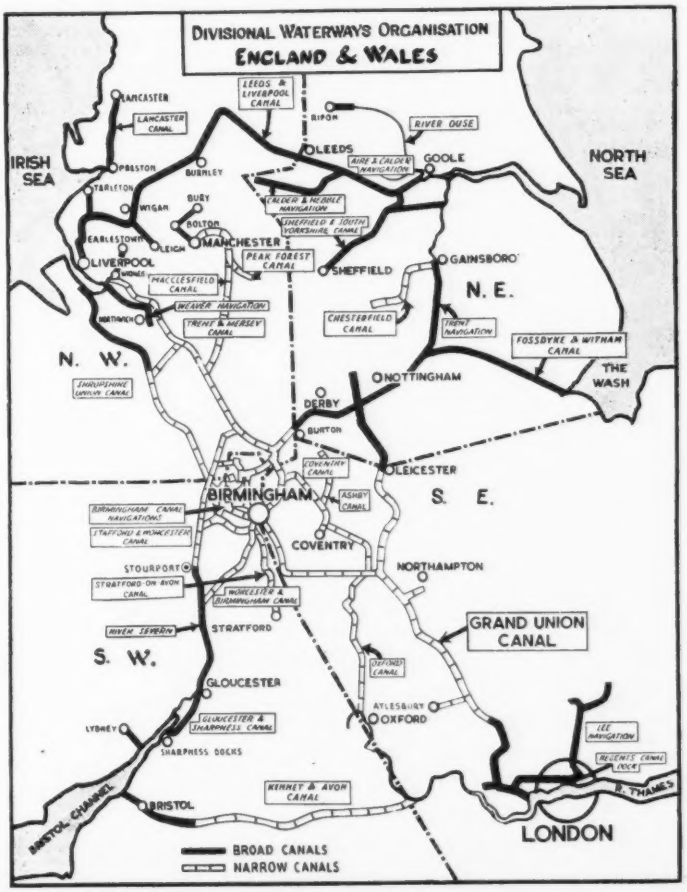
To an increasing extent people are finding that it is better, and in the end easier, to know why and how the appliances we use work. When meeting railwaymen from some Continental administrations I have often found that they are educated to a higher technical standard than is usual with us. I do not suggest that to become operators of transport the young men of the future must all be trained as engineers. I do suggest most strongly that what these young men really want is education in the ever expanding technique of "making" transport, be it by land, sea, or air. Equally on the commercial side, I think it would be possible to devise a course more directly of value to the young when they are young.

* Abstract of a paper read by Mr. F. J. Wymer, General Assistant to Chief Regional Officer, Southern Region, before the Southern Section of the Institute of Transport at Southampton on January 12

Divisional Waterways Organisation

The British Transport Commission became the owner on January 1, 1948, of inland waterways totalling 2,064 miles. In addition, the 69 miles of the Caledonian and Crinan canals, heretofore vested in the Minister of Transport, were transferred to the British Transport Commission on April 1, 1948.

Under a Scheme of Delegation dated December 23, 1947, which came into operat-



Divisional Waterways Organisation, B.T.C.

ion on January 1, 1948, the Commission has delegated to the Docks & Inland Waterways Executive all the rights, powers, and liabilities of the Commission in connection with carrying on the nationalised canal and inland navigation undertakings, other than those which were owned by the main-line railway companies. These railway-owned canals are now in course of transfer, but, until they are turned over, they continue to be included in the activities delegated to the Railway Executive.

CANAL AREAS

The canals in England and Wales were first divided into five areas as an interim measure, namely, northern, north-western, eastern, western, and southern, and these areas were indicated in the map reproduced in our issue of January 2, 1948. Subsequently, canals and inland waterways were organised in four divisions in England and Wales, each under the direction of a Divisional Waterways Officer, and the mileage is distributed as follows:—

North-Eastern Division	402
North-Western Division	662
South-Eastern Division	471
South-Western Division	447
Total	1,982

The boundaries of this divisional waterways organisation are shown on the map on page 275. We recorded in our issue of December 3 last (page 636) the transfer from the Railway Executive to the Docks & Inland Waterways Executive of eight canals previously under the control of the former L.M.S.R., on dates in July and August of last year. In addition, on December 1, 1948, the following former railway-owned canals were transferred to the control of the D. & I.W.E.: Ashton, Chesterfield, Macclesfield, and Peak Forest.

Questions in Parliament

Glasgow Railway Services

Mr. J. Carmichael (Glasgow, Bridgeton—Lab.) on February 7 asked the Minister of Transport if he was aware that Glasgow Corporation had been in communication with the Ministry of Transport and the British Transport Commission since September, 1948, requesting a meeting to discuss the future utilisation of local railway services in the Glasgow district and surrounding areas, particularly as regarded the possibility of such services being electrified; that consultations with other local authorities in connection with the Town & Country Planning (Scotland) Act, 1947, were being delayed pending the meetings between Glasgow Corporation, the Ministry of Transport, and the British Transport Commission; and, in view of these considerations, if he would take steps to expedite the proposed meeting.

Mr. Alfred Barnes (Minister of Transport) in a written answer, stated: I regret the delay which has taken place. A reply will be forwarded shortly.

Railway Pensioners

Sir Patrick Hannon (Birmingham, Moseley—C.) on February 14 asked the Minister of Transport if he would make regulations under section 98 of the Transport Act, 1947, to provide for the revision of pensions granted under superannuation schemes by railway and canal companies having regard to the increased cost of living since retirement had taken place.

Mr. L. J. Callaghan (Parliamentary Secretary, Ministry of Transport) wrote in reply: No, Sir. The question of granting supplementary allowances to existing pensioners has been raised by the trade unions and by other parties with the Railway Executive, who have had to decline such applications on grounds of cost. The Minister would not feel justified in making regulations on this subject.

Late Running of Mail Train

Major Guy Lloyd (East Refrew—C.) on February 23 asked the Postmaster-General whether he was aware of the dissatisfaction of business men in Glasgow and East Renfrewshire at the persistent delay in delivery of mails from London, which were not delivered to the addresses until the afternoon of the day following posting in London; and whether he would take steps to expedite their delivery.

Mr. W. Paling (Postmaster-General): I much regret that, owing to late running, correspondence carried by the special mail train from London to Scotland is not now included in the first delivery in Glasgow and East Renfrewshire. Correspondence for Glasgow is necessarily included in the delivery beginning at 11.30 a.m. Everything practicable is being done, in close collaboration with the Railway Executive, to bring about such improvement as will permit correspondence carried by this mail train to be delivered by first delivery in Glasgow.

Major Lloyd: While not in any way imputing any sort of blame to the Postmaster-General or to his department, is the Postmaster-General aware that hundreds of thousands of business men and other people in Glasgow are gravely inconvenienced by this, and may I, on their behalf, ask him to use his utmost influence with the railways to see that trains arrive at least within two or three hours of the times scheduled?

Mr. Paling did not reply.

Sailing Tickets to Northern Ireland

Sir Ronald Ross (Londonderry—C.) on February 28 asked the Prime Minister if he was aware that Northern Ireland was handicapped in endeavouring to attract more visitors, particularly by the fact that visitors to Northern Ireland sailing from United Kingdom ports had to have sailing tickets, whereas no such restriction was put on visitors sailing from United Kingdom ports to the Continent of Europe; and, in view of the hardship involved by that and other handicaps, if he would set up an inter-departmental committee with representatives of the Home Office, Board of Trade, Ministry of Transport, Ministry of Civil Aviation, British Transport Commission, British European Airways, and the Government of Northern Ireland to consider what steps could be taken to encourage both the people of Great Britain and visitors to Great Britain to take holidays in Northern Ireland.

The Prime Minister (Mr. C. R. Attlee): Experience has shown that sailing tickets

Additional Cross-Channel Services

British Railways (Southern Region) announce that additional cross-Channel services will be run between May 15 and October 1 inclusive. Below we give a full table of summer services to Paris, which will have in the height of the season six services daily and two more tri-weekly, compared with its present five daily and one weekly, as shown in the table on page 145 of our February 11 issue.

LONDON TO PARIS

		1st, 2nd, 3rd (a)	1st, 2nd, 3rd (e)	1st, 2nd (d)	1st (d)	1st, 2nd (d)	1st, 2nd, 3rd (b)	1st, 2nd, 3rd (c) (j)	1st, 2nd (f) (sleeping cars)
Victoria ...	dep.	8 00	9 35	10 00	10 30 (GA)	14 00	20 20		22 00
Waterloo ...	dep.							21 00	
Boulogne ...	arr.	11 50							
,, ...	dep.	12 52							
Calais ...	arr.			13 55	13 55	17 50			
,, ...	dep.			14 22	14 13	18 15			
Dunkerque ...	arr.								4 30
,, ...	dep.								4 55
Dieppe ...	arr.		14 55				2 10		
,, ...	dep.		15 55				3 05		
Havre ...	arr.							6 15	
,, ...	dep.							8 45	
Paris Nord ...	arr.	16 00		18 00	17 33	22 00			9 30
,, St. Lazare ...	arr.		18 40				5 50	11 52	

PARIS TO LONDON

		1st, 2nd (d)	1st, 2nd, 3rd (e)	1st, 2nd (d)	1st (d)	1st, 2nd, 3rd (a)	1st, 2nd, 3rd (h) (j)	1st, 2nd (f) (Sleeping cars)	1st, 2nd, 3rd (g)
Paris St. Lazare ...	dep.		10 00				17 15		21 45
,, Nord ...	dep.	8 05		11 50	12 20 (GA)	14 00		21 30	
Havre ...	arr.						20 20		
,, ...	dep.						22 30		
Dieppe ...	arr.		12 44						0 29
,, ...	dep.		13 45						1 30
Dunkerque ...	arr.							1 44	
,, ...	dep.							2 15	
Calais ...	arr.	11 49		15 20	15 32				
,, ...	dep.	12 15		16 00	16 00				
Boulogne ...	arr.					17 04			
,, ...	dep.					18 10			
Waterloo ...	arr.						9 07*		
Victoria ...	arr.	16 05	19 15	19 50	19 30	22 00		9 10	7 35

(GA) "Golden Arrow." (a) Daily (including Sundays), June 25-Oct. 1 incl. (b) Tuesdays, Thursdays and Saturdays, June 18-Oct. 1. (c) Mondays and Fridays (also Wednesdays, June 8-Sept. 28). (d) Daily (Sundays included.) (e) Daily from May 15. (f) Every night. (g) Mondays, Wednesdays and Fridays, June 17-Sept. 30. (h) Tuesdays and Saturdays (also Thursdays, June 9-Sept. 29). (j) 1st and 3rd only, Waterloo—Southampton and Southampton—Waterloo.

* On May 18, dep. So'ton 6.30, arr. W'loo 9.02; on May 22, dep. So'ton 6.48, arr. W'loo 9.00.

are the best method of minimising inconvenience to passengers at peak periods when traffic exceeds capacity. Every endeavour will be made to arrange additional sailings whenever possible. The departments and other agencies concerned are in constant touch with each other on questions connected with travel to Northern Ireland, and I see no need for the appointment of an inter-departmental committee.

Sir Ronald Ross: Is the Prime Minister aware that the ships normally used between Great Britain and Northern Ireland have been diverted to routes to Dublin and to the Continent of Europe, and that this restriction on travel to Northern Ireland was unknown under any Government in peacetime?

The Prime Minister: Sir Ronald Ross knows some of the difficulties in regard to the checking of passengers to Northern Ireland owing to there being a frontier on the southern side of Northern Ireland. With regard to the other question, perhaps Sir Ronald Ross will put it to the Minister of Transport.

Professor D. L. Savory (Belfast University—C.): Is the Prime Minister aware that last year several thousand people from this country were prevented from going to Northern Ireland because they could not get sailing tickets, and that they had to cancel the rooms they had taken in hotels and boarding houses, to the great inconvenience of those people who were looking forward to receiving them?

The Prime Minister: Perhaps Professor Savory will also put that question to the Minister of Transport.

Sir Ronald Ross: But the Minister of Transport will not take it.

Railway Electrification Schemes

Mr. Ernest Davies (Enfield—Lab.) on February 18 asked the Minister of Transport if he would name the railway electrification schemes undertaken since VJ Day; and give in each case the mileage involved, the cost, and the anticipated dates of completion.

Mr. Alfred Barnes (Minister of Transport) stated in a written answer: No new schemes have been put in hand since VJ Day; the works described below refer to schemes which were started before the war and which were resumed after VJ Day:—

Scheme	Opened for Traffic or anticipated date of opening	Route mileage	Cost exclusive of rolling stock
London Transport Executive			
Eastern Extension of Central Line :—			
Liverpool Street—Stratford	December 4, 1946	4·2	£10,820,000
Stratford—Leytonstone	May 5, 1947	2·3	
Leytonstone—Newbury Park and Woodford	December 14, 1947	7·0	
Newbury Park—Hainault	May 31, 1948	1·9	
Woodford—Loughton and Northern half of Fairlop Loop to Hainault	November 21, 1948	5·7	
Loughton to Epping	August, 1949	4·9	
Western Extension of Central Line :—			
North Acton to Greenford	June 30, 1947	3·7	£2,640,000
Greenford to West Ruislip	November 21, 1948	4·4	
Railway Executive			No final costs can yet be given as negotiations with regard to the revision of prices based on pre-war tenders are in hand
Liverpool Street—Shenfield	End of 1949	23	
Manchester—Wath—Sheffield	End of 1952	75	

Sale of Concrete Sleepers

Mr. F. J. Erroll (Altrincham & Sale—C.) on February 21 asked the Minister of Works what was the reason for the loss of £882,000 expected from the sale of concrete sleepers during 1948-49.

Mr. C. W. Key (Minister of Works): There was no loss on the sale of concrete sleepers during 1948-49. Production fell short of the number on which the estimate was based, so that both expenditure and receipts were less than anticipated.

Mr. Erroll: As this figure is shown in the supplementary estimates, surely the Minister can explain why the loss is so great, and why production is continuing on a sleeper the railways do not want?

Mr. Key: There is no loss; it is due to a fall in production. Mr. Erroll will see that there is also a sum of £614,000 in the estimates as being less than the amount anticipated to meet the cost of production. The rate of production has now been increased and output is up to expectations.

Dismissals at Railway Locomotive Works

Mr. Rhys Davies (Westhoughton—Lab.) on February 10 asked the Minister of Labour whether he was aware that the employers had given notice of dismissal to 120 of their employees at the Horwich, Lancashire, railway locomotive works; what other large-scale dismissals were taking place at present; to what extent the employers or trade unions were in consultation with his Department; and what steps he was taking to secure employment for these men in other spheres of industry.

Mr. George Isaacs (Minister of Labour), in a written answer, stated: Yes, though this figure has now been reduced to 55. My local office has been working in close co-operation with the management and trade union representatives. Early notice of the redundancy has been given and the men are registering for employment in advance of discharge. Of the 37 men due for discharge up to February 18, 17 have already been found alternative employment and the others have been submitted for various jobs. The 18 men due for discharge on February 25 are being registered in order to submit them to suitable vacancies. I cannot without detailed enquiry give Mr. Davies the information he asks about any other similar redundancies.

Rolling Stock for Tanganyika

Lt.-Colonel J. H. Hare (Woodbridge—C.) on February 16 asked the Secretary of State for the Colonies when had indents for rolling stock replacements first been received from the Tanganyikan railways; and how had those requirements been complied with.

Mr. A. Creech Jones (Secretary of State for the Colonies): The first indents for the post-war replacement of wagons and locomotives for the Tanganyikan section of the East African Railways were received in 1945. The sixty-one wagons then ordered were supplied in 1947, and the two locomotives are due for delivery this year. Eight locomotives subsequently applied for were supplied last April.

Colonel Hare: Is the Colonial Secretary satisfied that we shall be able to supply the amount of steel needed in these territories? Is he certain that the Government has given a large enough allotment of steel for providing adequate rolling stock for the Colonies as a whole?

Mr. Creech Jones: Yes, we have taken the requirements of transport in Africa very seriously indeed, and I hope we shall get progress with the programme.

East African Transport Problems

Mr. B. Janner (Leicester West—Lab.) on January 26 asked the Secretary of State for the Colonies if he would make a statement on the conference on East African transport recently held in London.

Mr. A Creech Jones (Secretary of State for the Colonies) in a written answer stated: At my invitation the Chairman of the East Africa High Commission, the Acting Governor of Tanganyika, and the East African Commissioner for Transport, accompanied by certain transport advisers, came to London at the end of December for discussions with the Minister of Food and the Parliamentary Secretary, Ministry of Transport, and myself on general transport problems in East and Central Africa. Representatives of the Overseas Food Corporation, the Colonial Development Corporation, the East African Conference Lines and officials and advisers of the United Kingdom Government departments concerned took part in the discussions, which lasted from January 3 to 7.

The Conference brought under review the particular and immediate problem of the capacity of the port of Dar-es-Salaam, and learned from the East African representatives of the steps which had already been taken and which are projected to enable the port to handle the estimated tonnages of all users in the immediate future. These measures include the provision of additional lighterage, cranage, and rolling stock, the extension of the lighterage quay, the more expeditious handling of cargoes on the quayside, an effective system of port management, more storage, and ultimately, two deep-water quays, the first of which is expected to be completed by the end of 1951 and the second in 1952.

The Conference also considered the more general problem of the longer-term developments of communications in East and Central Africa. As Mr. Janner will be aware from my reply to Mr. S. Wingfield Digby (Western Dorset—C.) on December 1 last, proposals are in an advanced stage of consideration for a survey of alternative routes to provide a railway link between the Rhodesian and East African railway systems and also the route Broken Hill—Mikindani. The conference regarded that part of the North-South link which would join the Tanganyika section of the East African railways with Mombasa as of the greatest importance, particularly as it would provide a spillway through Mombasa and Tanga, should the port of Dar-es-Salaam prove incapable, even with the addition of two deep-water quays, of handling the increased volume of traffic likely to emerge from the economic development of Tanganyika. A technical committee in East Africa is at present investigating the possibilities of Dar-es-Salaam ever being developed beyond the present contemplated extensions into a major port. Its report will, I hope, be available in March, 1949, and in the light of its recommendations it would be possible to take decisions on the urgency of that part of the North-South link which would join the Tanganyika system to Mombasa.

Notes and News

Qualified Chemist Required.—A qualified chemist, capable of controlling base exchange water softening plants throughout the system, is required by the Rhodesia Railways. See Official Notices on page 279.

Draughtsmen Required.—A firm of coachbuilders in the Midlands requires the services of draughtsmen experienced in the design and construction of public service vehicles, both composite and all-metal. See Official Notices on page 279.

Queensland Rolling Stock Orders.—A Reuters report states that the Queensland Transport Minister has announced that 700 steel wagons and 300 other wagons, costing £A1,115,000, will be constructed by the Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Isle of Man Railway Company.—The statement of accounts for the year ended December 31, 1948, shows receipts of £98,219 and expenditure of £84,027, leaving a balance of £14,192. With the addition of the balance from last year and interest on investments and deduction of interest on debenture stock, rent charges, etc., the balance available for dividends is £8,403, compared with £8,203 for 1947. The directors recommend the payment of dividends at the rate of 5 per cent. on the preference shares and 2½ per cent. on the ordinary shares.

Crewe Works Amateur Dramatic Society.—After presenting Mr. Terence Rattigan's comedy "While the Sun Shines," at the Goddard Street canteen, between February 23 and 26, the London Midland Region Crewe Works Amateur Dramatic Society has taken the play to the Loggerheads sanatorium. The producer of the Repertory Company (now doing a season at the New Theatre) who was present at one of the performances at the Goddard Street canteen, has said that, in his opinion, it was the most talented in the country. In particular, the acting of Accounts Clerk Marion Rutherford as Lady Elizabeth Randall and Machinist Frank Lowe as the French Lieutenant have been commended. Over 1,500 persons saw "While the Sun Shines" and from the proceeds the Society is buying a wireless set for the Railway Veterans Institute.

Weekend Discussion Group.—The Railway Students' Association, London School of Economics & Political Science, has arranged for a weekend discussion group meeting to be held at British Railways Training Centre, St. Ronans, Hadley Wood, between March 26 and 28.

Transfer of Railway Canals.—Three more of the former railway-owned canals were transferred from the Railway Executive to the control of the Docks & Inland Waterways Executive as from February 28. They are the Grantham Canal, the Nottingham Canal, and the Kennet & Avon Canal.

British Transport Stock (Amendment) Regulations.—The Minister of Transport has made the British Transport Stock (Amendment) Regulations (Statutory Instrument 1949 No. 183), under section 89 of the Transport Act, 1947. Copies of the Order are obtainable from H.M. Stationery Office, or through any bookseller, price 1d. net.

Liverpool Overhead Traffics.—During the week ended February 27, Liverpool Overhead Railway receipts amounted to £2,635 and brought the aggregate for this year up to £22,224. Traffics for the week were £433 above those for the corresponding period in 1948, and have made a total advance of £615 in the current eight weeks.

Sligo, Leitrim & Northern Counties Railway Company.—A loss of £3,621, compared with £4,762 in 1947, was disclosed in the accounts of the Sligo, Leitrim & Northern Counties Railway Company adopted at the annual meeting of the company in Sligo on February 25. The loss was reduced by a grant-in-aid given by the Northern Ireland Government and other receipts to a net loss of £1,292, against a loss of £1,918 in 1947. The Hon. William Trench, Chairman, said that he did not know how the company would be affected by the transport proposals now being put forward by the Eire and Northern Ireland Governments. It would be idle to attempt to forecast the future of the concern.

Draughtsman Required.—A well-known London technical publishing firm requires the services of a draughtsman experienced in preparing engineering drawings suitable for reproduction in high class technical journals. See Official Notices on page 279.

British Railways, Southern Region, Lecture & Debating Society.—Sir Herbert Walker, former Director and at one time General Manager, Southern Railway, will be in the Chair at a meeting of British Railways, Southern Region, Lecture & Debating Society, on March 24, when Mr. J. L. Harrington, Chief Officer (Administration), Railway Executive, will read a paper on: "The Channel Tunnel and Ferry." The meeting will be held at the Chapter House, St. Thomas' Street, London Bridge, at 5.45 p.m.

New Israeli Railway Lines.—A Reuters report from Tel Aviv announces that a single-track line is under construction between Hadera and Tel Aviv, through the Sharon Plain area. A second track is to be added later. It is hoped that the line will be opened by the middle of this year. It will constitute the southern part of the railway from Haifa to Tel Aviv, which hitherto skirted the eastern fringe of the Sharon Plain, passing through Tulkarm and Lydda, and involving reversal at Lydda. It will shorten the rail distance from Haifa to Tel Aviv by 20 miles. The cost is put at £1,650,000 (Israeli). A large new station is also to be built on the northern outskirts of Tel Aviv.

Channel Islands Sailing Tickets.—Sailing tickets, in addition to travel tickets, will be required for journeys to, or from, the Channel Islands, on the following days during the summer:—

To the Channel Islands	
Southampton route	Fridays and Saturdays—May 20 to September 24 inclusive
Weymouth route ...	Saturdays—May 28 to September 24 inclusive
From the Channel Islands	
Southampton route	Saturdays—June 4 to October 1 inclusive
Weymouth route ...	Saturdays—June 11 to October 1 inclusive

The issue of sailing tickets for journeys on these days commenced on March 1. This summer, sailing tickets for homeward journeys from the Channel Islands will be obtainable before the outward journey, at the Continental Enquiry Office, Victoria Station (for Southampton route) and Central Enquiry Bureau, Paddington Station (Weymouth route). Cabins and berths on the night steamers from the Islands for homeward journeys also can be reserved before outward journeys, at these offices.

English Electric Company Report.—Brief reference to the 1948 results of The English Electric Co. Ltd. was made in our last issue. Group trading and other profits were £1,496,637 and the net profit £1,232,518. The latter was reduced to £535,027 by appropriations for interest, reserves, and income tax. From the net profit must be deducted, also, £55,513, being non-trading and non-recurring revenue, which makes the profit £479,514, against £273,584, and shows an increase of £205,930 on a comparable basis with 1947. Group net current assets amount to £5,346,573 and those of the parent company to £3,034,713. The company has subscribed additional capital of £174,898

Mr. John Elliot Leaves for Australia

Showing, left to right, Mr. John Elliot, C.R.O., Southern Region, Mrs. Elliot, and Mr. A. C. J. Payne, Principal, Southern Region Staff Training College, at Heathrow on March 2, before leaving for Australia (see our February 11 and 25 issues)

OFFICIAL NOTICES

None of the vacancies on this page relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he, or she, is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

RUSTON & HORNSBY DIESEL LOCOMOTIVES, 4 wheel, chain driven, 24 in. gauge, 3 speed gearbox, forward or reverse, with Lister 2-cyl. vertical water-cooled engine, 600 r.p.m. Two 20 H.P.; three 16 H.P.; three 10 H.P. Condition equal to new; ready for immediate use.—Cox & Danks Limited, Plant & Machinery Dept., Scapa Works, Neath, Glamorgan—Neath 2205; Langley Green, Oldbury, Birmingham—Broadwell 2011.

MECHANICAL APPLIANCES FOR HANDLING RAILWAY TRAFFIC. By G. Bulkeley. An explanation of the employment of mechanical apparatus for handling and carting general goods. Cloth. 7½ in. by 5 in. 132 pp. Illustrated. 5s. *By post* 5s. 3d.

Rhodesia Railways

REQUIRED: Qualified Chemist, capable of controlling Base Exchange water softening plants throughout the system. Will also be required to initiate a small laboratory to deal with physical testing and metallurgical work, and in addition the analytical work connected with the testing of all classes of railway stores. Salary £640 by £30 to £1,000 per annum, plus cost-of-living allowance, at present amounting to 18 per cent. on basic salary, and children's cost-of-living allowance where applicable. Starting salary may be above the minimum according to qualifications and experience. Apply in writing giving full particulars of age, marital state, qualifications, and experience to the Chief Mechanical Engineer, P.O. Box 703, Bulawayo, Southern Rhodesia.

LARGE Midland firm of Coachbuilders require Draughtsmen experienced in the design and construction of Public Service Vehicles, both composite and all-metal. Please reply details of age, experience, and salary required to Box 292, *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

DRAUGHTSMAN wanted by well-known London technical publishing firm. Must be experienced in preparing engineering drawings suitable for reproduction in high class technical journals. Salary £350 p.a. Write stating age and experience.—Box 286, c/o *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

MACHINE TOOLS available for immediate delivery:—Lang 15-in. Lathe; Reid Prentice 12-in. Lathe; Cleveland 1½-in. Auto; Footburt 1-in. Auto; Herbert No. 9 Turret Lathe (reconditioned); Archdale 18-in. and 20-in. Horizontal Millers; Cincinnati No. 3 Horizontal Miller; Fellows No. 6 Gear Shapers; Asquith Profile Millers. Send your enquiry today—we can meet all your requirements from our present stocks.—Modern Machine Tools Limited, Maudslay Road, Coventry. Telephone: 2132/3/4/5/6. Telegrams: Modern.

THE EVOLUTION OF RAILWAYS. Second edition, revised and enlarged. By Charles E. Lee. Traces the germ of railways back to Babylonian times. Cloth. 8½ in. by 5¼ in. 72 pp. Illustrated. 6s. *By post* 6s. 4d.

to provide for the increasing activities of the English Electric Valve Co. Ltd., the English Electric Co. (South Africa) Ltd., and the Kingsway Housing Association. A further payment of £443,950 has been made to Cable & Wireless (Holding) Limited, which leaves only the final payment to be made to complete the purchase of Marconi's Wireless Telegraph Co. Ltd.

Renold & Coventry Australian Company.—An agreement has been signed by the Renold & Coventry Chain Co. Ltd. and McPherson's Limited, Melbourne, whereby plant for the manufacture of chain and allied products will be set up in Australia by a new company, to be known as Renold Chains (Australia) Pty. Ltd., in which the Renold & Coventry Chain Co. Ltd. will have a controlling interest.

Voluntary Liquidation of Uruguay Railway Companies.—The voluntary liquidation of the following companies, and the appointment of Mr. H. J. Binder and Mr. A. J. Medlycott as joint liquidators, have been approved at extraordinary meetings of the companies:—

Quarahim International Bridge Co. Ltd.; Uruguay Northern Railway Co. Ltd.; Central Uruguay Railway Company of Monte Video Limited; North Western of Uruguay Railway Co. Ltd.; Midland Uruguay Extension Railway Co. Ltd.; Midland Uruguay Railway Co. Ltd.

West Yorkshire Road Car Co. Ltd.—The report for 1948 shows a profit of £276,074, to which has been added £75,051 brought forward from last year. Payment is recommended of a final dividend of 6½ per cent., tax free, on the ordinary shares, making 12½ per cent., tax free, for the year, and a special bonus of 2½ per cent., free of income tax, on the ordinary shares. A sum of £150,000 is to be transferred to general reserve, which will be increased further by the transfer of £21,500, held in reserve for future taxation, leaving £75,850 to be carried forward.

Manchester Ship Canal Finances.—The net receipts of the Manchester Ship Canal Company for 1948 amounted to £943,101, as compared with £872,138 for the previous year. Various other items yielded £64,638. After allowing for charges of £126,716, there remained £881,023, plus £23,212 brought in from last year. Income tax absorbed £170,000. Debenture interest and loan took £344,067 and £35,000 is being placed to reserve for contingencies and repairs. The ordinary dividend is increased from 2 per cent. to 2½ per cent., and the preference from 4 per cent. to 5 per cent., leaving £24,235 to be carried forward.

Locomotive Naming Policy Unchanged.—The Railway Executive states that, contrary to reports in some quarters, it has no intention of removing the existing names of locomotives or of discontinuing the general practice of naming locomotives in suitable cases.

Institute of Transport Congress.—The first post-war congress of the Institute of Transport is to be held at Buxton from June 22 to June 24 inclusive. The provisional programme includes a paper on "The Team Spirit in Industry," by Mr. J. Benstead (Deputy-Chairman, British Transport Commission); a choice of visits to centres of interest at Derby; reception by the Mayor of Buxton; a paper on "The Philosophy of Transport," by Mr. Raymond Birch (former Member of Council); reception by the President, and dance; and a choice of visits at Manchester. The headquarters for the Congress will be the Palace Hotel, Buxton.

L.M.R. Music Hall.—The seventh edition of "Carry On Music Hall" was received by a large and appreciative audience at St. Pancras Town Hall, on March 7. The show was produced by the London Midland Region staff news magazine *Carry On*, in aid of the A.S.L.E. & F. orphan fund and included 22 acts by L.M.R. performers, with Mr. Jim Peasey, Driver, Cricklewood, as compere and Messrs. Bill Southern, Clerk, Euston, and Jack Ody, Porter, Euston, as stage managers. The programme included a variety of entertainment from London, Wolverhampton, Crewe, Derby, and Wolverton. The orchestra was under its Musical Director, Mr. John Grindley, and the accompanist during the vocal turns was Mr. George Kirby, Clerk, Euston.

Australian Railway Gauge Standardisation.—A Reuters report from Canberra states that the Commonwealth Government is to proceed with the standardisation of railway gauges despite the objections of New South Wales, which has demurred at paying £A10 millions towards the cost of gauge alterations on the railways in other States because it already has the standard gauge. The Australian Premier, in announcing the scheme, said it would take 30 years to complete and the total cost would be £A76 millions. It has been reported that it would cost £A26 millions, irrespective of gauge standardisation, to modernise the Western Australian Railways. The Premier added that the Government was seeking to import steel rails from Italy and steel rods from Japan.

Railway Wage Claim Hearing.—The claim by more than 400,000 railwaymen to a wage increase of 12s. 6d. a week came before the Railway Staff National Tribunal under the chairmanship of Sir John Forster on March 7. The hearing was continued on the next day. Mr. J. B. Figgins, N.U.R., applied for the proceedings to be held in public, but the Tribunal decided to sit in private.

Central Uruguay Railway Debentures.—Holders of Central Uruguay Railway Company of Monte Video 5 per cent. second debentures are informed by the joint liquidators that the stock will be redeemed at 86 per cent. on April 5, plus, thereafter, a *pro rata* participation in the surplus assets (if any), after payment to the ordinary stockholders of a maximum of 12½ per cent. of the nominal amount of such stock.

Threat of Indian Rail Strike.—On March 7 troops and police began to guard important sections of the Indian railways as the result of a threat by Communist-led sectional railway unions to strike. In Bombay they had orders to shoot at sight anyone tampering with public property. The All-India Railwaymen's Federation, the biggest union, is opposing a stoppage, and only two important unions—the South Indian Railway and the Bombay Baroda & Central India Railway—have served notices. The Communist party has called on all railwaymen to strike.

Timber Trades Conference in London.—At a conference organised by The Timber Development Association in London, on March 8, with the Earl of Dunmore in the chair, delegates unanimously adopted a resolution urging the Government to review the present level of imports and allocations of softwood, hardwood, plywood, veneers, and mining and other timbers, with the object of finding out in what way and to how large an extent, adjustments could be made which would provide greater supplies of these materials without adversely affecting balance of payments between sterling and dollar areas. Sir Archibald Harris, who was Timber Controller during the war, expressed the view that continuance of the present policy, involving the maximum substitution of timber by other materials, irrespective of their suitability and

economic considerations, was harmful to the industries concerned and to the national economy. Mr. T. A. Storey, Chairman of the Association, said that it was no part of their case that the production of steel, concrete, etc., should be reduced.

Western Region First Aid Awards.—First aid awards were presented to 130 members of the British Railways, Western Region, Paddington staff, at a smoking concert recently, by Mr. K. W. C. Grand, Chief Regional Officer, assisted by Mr. C. W. Powell, London Divisional Superintendent. Mr. Grand said they were an example to the younger members, who, it was hoped, would be encouraged to take an interest in this work.

Forthcoming Meetings

March 11 (*Fri.*).—Institute of Transport. South Wales & Monmouthshire Section, at the South Wales Institute of Engineers, Cardiff, at 7.15 p.m. "Ports and Shipping," by Mr. L. J. Callaghan, Parliamentary Secretary to the Ministry of Transport.

March 12 (*Sat.*).—Permanent Way Institution, Manchester & Liverpool Section, at St. John's Ambulance Brigade H.Q., Chapel Walk, Preston, at 2.30 p.m. "Hallade Realignment of Curves," by Mr. I. P. Strachan.

March 15 (*Tue.*).—York Locomotive Society, in the Railway Institute, York, at 7 p.m. Federation meeting. "The North Eastern Region of British Railways in 1948," by Mr. C. P. Hopkins, Chief Regional Officer, North Eastern Region.

March 16 (*Wed.*).—Institution of Railway Signal Engineers, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 6 p.m. Annual general meeting.

March 16 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, at 5.30 p.m. "Some Developments in Locomotive Workshop Practice, 1939-48," by Mr. I. C. Forsyth.

March 16 (*Wed.*).—Institution of Railway Signal Engineers, at the Westinghouse Brake & Signal Co. Ltd., Chippenham, Wiltshire, at 7.30 p.m. "Typical Selection Circuits," by Mr. J. P. Loosemore.

March 16 (*Wed.*).—Institute of Welding, North London Branch, at the South West Essex Technical College, Walthamstow, at 7.30 p.m. "Development in the Technique of Resistance Welding," by Mr. C. A. Burton.

March 17 (*Thur.*).—Diesel Engine Users Association, at Caxton Hall, Westminster, London, S.W.1, at 2.30 p.m. "The Principles of Diesel Engine Waste Heat Recovery," by Mr. T. R. Houston.

March 17 (*Thur.*).—British Railways, Western Region, London Lecture & Debating Society, in the Clerks' Dining Club, Bishop's Bridge Road, Paddington, at 5.45 p.m. Annual general meeting and young men's discussion.

March 18 (*Fri.*).—Institute of Transport annual dinner at the Connaught Rooms, Great Queen Street, London, W.C.2, at 6.45 for 7.15 p.m.

March 18 (*Fri.*).—Institution of Railway Signal Engineers, at the London Transport Executive Signal School, Earls Court Station, S.W.5, at 6.15 p.m. "Typical Selection Circuits," by Mr. J. P. Loosemore.

Railway Stock Market

Doubt regarding the implications of international political moves has added fresh depression to the stock markets and the downward trend of values has continued. Industrial shares were again chiefly hit and this section was dominated by reports of changing trends in the export markets and by increasing competition at home. Even the record steel output announced for last month failed to help. With the public taking the view that the outlook will remain obscure until after the Budget there has been little buying. In the circumstances, prices fell back on a wide front. Many industrial shares are at levels which can hardly be justified unless reduced dividends are in prospect. The fall in values has been indiscriminate and, though they may go lower with the Stock Exchange in its present mood, upward adjustments seem likely in many cases when buyers return. Even British Funds lost their firm undertone and falls of ¼ were recorded by 2½ per cent. Consols and Treasury Bonds. Moderate declines were also recorded among the nationalisation stocks and 3 per cent. Transport (1978-88) eased to 101 1/16.

There was only moderate business in Brazil rails, which moved narrowly in the absence of fresh take-over rumours, and other foreign rails were quiet. Great Western of Brazil fluctuated around 113s. Leopoldina ordinary was 9¼, the preference eased to 31½, and the 4 per cent. debentures to 87, while the 6 per cent. debentures were 108 and Leopoldina Terminal 5 per cent. debentures 85. B.A. Central 4½ per cent. debentures changed hands around 37½ and the 5 per cents. marked 18½. Antofagasta ordinary eased to 9, and the preference stock to 57½, while Manila "A" debentures and preference shares remained fairly active, changing hands around 83 and 8s. 6d. United of Havana 1906 debentures eased further to 12¼ and San Paulo at 146 was lower again in the absence of any fresh moves. French Railway sterling bonds have been firmer with Midi and Orleans both slightly higher at 95½ and 95. Mexican Railway 6 per cent. debentures were 86½. Latest traffics helped to put Canadian Pacifics easier at 19⅝ xd. with the preference stock at 75 and the 4 per cent. debentures 108½. Beira Railway bearer shares held steady at 46s.

Road transport shares receded, and particularly those in the B.E.T. group, which recently had moved higher on hopes that take-over developments on similar lines to the Tilling deal might be in prospect. It now appears that the question of any general take-over of the B.E.T. interests will have to await the outcome of the next General Election and meanwhile shareholders seem virtually assured of receiving dividends at the same rates. Opinion is divided as to whether take-over terms secured by voluntary negotiation would be much in excess of terms on the basis of compulsory acquisition. B.E.T. deferred stock has fallen sharply to £1,770, and this reflects general market trends. On the basis of a 50 per cent. dividend last year, B.E.T. deferred stock yields barely 3 per cent., but the assumption is that when dividend limitation and the Bonus Tax are no longer in force, there will be prospects of a materially higher return.

Iron and steel shares lost ground, apart from those in the nationalisation groups, take-over values in these cases having a steadying influence on market prices. Babcock & Wilcox came back to 71s., T. W. Ward to 67s. 9d., and Vickers to 29s. 9d.

Locomotive building and engineering shares reflected the general market trend, with North British Locomotive 21s. 10½d. xd., Vulcan 23s. 6d., Beyer Peacock 23s., and Gloucester Wagon 56s. 3d. Wagon Repairs 5s. shares were 20s. 9d.

Traffic Table of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffics for week: Total this year	inc. or dec. compared with 1947/48	No. of week	Aggregate traffics to date: Total 1948/9	increase or decrease
				£	£		£	£
South & Central America	Antofagasta... ...	811	27.2.49	67,570	+ 17,420	8	579,960	+ 128,400
	Bolivar	174	July, 1948	$28,960	— $69,357	30	$471,287	— $301,893
	Brazil	—	—	—	—	—	—	—
	Cent. Uruguay ...	970	6.11.48	32,712	+ 2,978	18	593,105	— 7,652
	Costa Rica	281	31.1.49	35,772	— 3,648	31	250,009	+ 12,870
	Dorada	70	Jan., 1949	31,649	+ 8,549	4	31,649	+ 8,549
	G.W. of Brazil ...	1,040	26.2.49	42,600	+ 800	8	340,000	— 5,200
	Inter. Ctl. Amer. ...	794	Jan., 1949	$1,089,802	— $198,851	4	$1,089,802	— $198,851
	La Guaira	22¾	Feb., 1949	$105,699	+ $15,467	8	$215,995	+ $47,685
	Leopoldina	1,920	26.2.49	48,694	+ 5,724	8	391,023	— 73,987
	Midland Uruguay ...	319	Sept., 1948	19,608	+ 3,123	12	67,355	+ 16,721
	Nitrate	382	28.2.49	18,217	+ 5,294	8	65,356	+ 19,577
	N.W. of Uruguay ...	113	Sept., 1948	5,686	— 1,213	12	16,335	+ 1,989
	Paraguay Cent. ...	274	25.2.49	£109,489	+ £31,466	35	£3,580,155	+ £1,321,094
	Peru Corp. ...	1,059	Feb., 1949	221,585	+ 69,198	35	1,604,881	+ 245,802
	Salvador	100	31.12.48	c267,000	+ c16,000	26	c776,000	+ c53,400
	San Paulo	153¼	—	—	—	—	—	—
	Taltal	156	Jan., 1949	9,915	+ 1,045	31	57,335	— 7,725
	United of Havana ...	1,301	26.2.49	$414,394	— $71,065	34	$8,123,593	— $2,982,519
	Uruguay Northern	73	Sept., 1948	1,072	+ 52	12	3,308	— 111
Canada	Canadian National...	23,473	Jan., 1949	9,327,250	+ 826,250	4	9,327,250	+ 826,750
	Canadian Pacific ...	17,037	Jan., 1949	6,941,750	+ 710,750	4	6,941,750	+ 710,250
Various	Barsi Light* ...	202	31.1.49	25,642	+ 2,497	44	272,310	— 22,852
	Beira	204	Nov., 1948	128,810	+ 18,938	9	255,148	+ 29,260
	Egyptian Delta ...	607	20.1.49	18,286	— 2,075	42	596,981	+ 110,321
	Gold Coast ...	536	Jan., 1949	243,578	+ 28,590	44	2,145,956	+ 538,937
	Manila	—	—	—	—	—	—	—
	Mid. of W.Australia	277	Dec., 1948	32,105	+ 4,664	26	175,849	+ 40,349
	Nigeria	1,900	Nov., 1948	495,323	+ 70,029	33	3,647,496	+ 716,766
	Rhodesia	2,445	Sept., 1947	643,980	+ 102,833	52	6,787,603	+ 612,938
	South Africa ...	13,347	12.2.49	1,411,997	+ 91,842	45	61,341,780	+ 3,702,575
	Victoria	4,774	Nov., 1948	1,452,889	+ 60,190	22	—	—

*Receipts are calculated @ 1s. 6d. to the rupee